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**OpenVMS System Management
Utilities Reference Manual: M-Z**

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OpenVMS System Management Utilities Reference Manual: M-Z

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| 131 | 2030 | 2030 | 2030 |
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Preface

The *OpenVMS System Management Utilities Reference Manual: M-Z* contains reference information about the utilities that are used to manage both the OpenVMS VAX and OpenVMS Alpha operating systems. This manual describes each system management utility and provides examples for frequently used commands and qualifiers. The utilities appear alphabetically.

Refer to the *OpenVMS System Management Utilities Reference Manual: A-L* for the utilities not discussed in this book. In addition to system management utilities, a description and usage summary of the AUTOGEN command procedure is presented in the *OpenVMS System Management Utilities Reference Manual: A-L*.

All commands follow standard rules of grammar as specified in the *OpenVMS DCL Dictionary*.

For information using these system management utilities and AUTOGEN, see the *OpenVMS System Manager's Manual*.

Intended Audience

This manual is intended for system managers and users of the system management utilities for the OpenVMS VAX and OpenVMS Alpha operating systems.

Document Structure

This manual has six parts, arranged alphabetically. Each part contains reference information for a system management utility. Table 1 shows the structure.

Table 1 Manual Structure

| Part | Utility |
|------|--|
| 1 | Monitor (MONITOR) |
| 2 | Mount (MOUNT) |
| 3 | POLYCENTER Software Installation Utility (PRODUCT) |
| 4 | Show Cluster (SHOW CLUSTER) |
| 5 | System Generation (SYSGEN) |
| 6 | System Management (SYSMAN) |

Related Documents

For more information on the system management utilities, please refer to the following documents:

- *A Comparison of System Management on OpenVMS AXP and OpenVMS VAX*
- *OpenVMS System Services Reference Manual*
- *OpenVMS System Management Utilities Reference Manual: A-L*
- *OpenVMS System Manager's Manual*
- *OpenVMS AXP Device Support: Developer's Guide*
- *OpenVMS DCL Dictionary*
- *OpenVMS Guide to System Security*
- *OpenVMS License Management Utility Manual*
- *OpenVMS User's Manual*
- *OpenVMS VAX Device Support Manual*
- *OpenVMS Programming Concepts Manual*
- *OpenVMS Programming Interfaces: Calling a System Routine*
- *OpenVMS Record Management Services Reference Manual*
- *OpenVMS Exchange Utility Manual*
- *POLYCENTER Software Installation Utility Developer's Guide*
- *VAX Hardware Handbook*
- *Volume Shadowing for OpenVMS*
- *VMScluster Systems for OpenVMS*

Conventions

The name of the OpenVMS AXP operating system has been changed to OpenVMS Alpha. Any references to OpenVMS AXP or AXP are synonymous with OpenVMS Alpha or Alpha.

The contents of the display examples for some utility commands described in this manual may differ slightly from the actual output provided by these commands on your system. However, when the behavior of a command differs significantly between OpenVMS VAX and OpenVMS Alpha, that behavior is described in text and rendered, as appropriate, in separate examples.

The following conventions are used to identify information specific to OpenVMS Alpha or to OpenVMS VAX:

Alpha

The Alpha icon denotes the beginning of information specific to OpenVMS Alpha.

VAX

The VAX icon denotes the beginning of information specific to OpenVMS VAX.

◆ The diamond symbol denotes the end of a section of information specific to OpenVMS Alpha or to OpenVMS VAX.

In this manual, every use of DECwindows and DECwindows Motif refers to DECwindows Motif for OpenVMS software.

The following conventions are also used in this manual:

Ctrl/*x* A sequence such as Ctrl/*x* indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.

PF1 *x* or GOLD A sequence such as PF1 *x* or GOLD *x* indicates that you must first press and release the key labeled PF1 or GOLD and then press and release another key or a pointing device button.

GOLD key sequences can also have a slash (/), dash (–), or underscore (_) as a delimiter in EVE commands.

Return In examples, a key name enclosed in a box indicates that you press a key on the keyboard. (In text, a key name is not enclosed in a box.)

... Horizontal ellipsis points in examples indicate one of the following possibilities:

- Additional optional arguments in a statement have been omitted.
- The preceding item or items can be repeated one or more times.
- Additional parameters, values, or other information can be entered.

. Vertical ellipsis points indicate the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.

() In command format descriptions, parentheses indicate that, if you choose more than one option, you must enclose the choices in parentheses.

[] In command format descriptions, brackets indicate optional elem You can choose one, none, or all of the options. (Brackets are not optional, however, in the syntax of a directory name in an OpenVMS file specification or in the syntax of a substring specification in an assignment statement.)

{ } In command format descriptions, braces indicate a required choice of options; you must choose one of the options listed.

boldface text Boldface text represents the introduction of a new term or the name of an argument, an attribute, or a reason (user action that triggers a callback).

Boldface text is also used to show user input in Bookreader versions of the manual.

italic text Italic text indicates important information, complete titles of manuals, or variables. Variables include information that varies in system messages (Internal error *number*), in command lines (/PRODUCER=*name*), and in command parameters in text (where *device-name* contains up to five alphanumeric characters).

UPPERCASE TEXT Uppercase text indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.

struct

Monospace type in text identifies the following C programming language elements: keywords, the names of independently compiled external functions and files, syntax summaries, and references to variables or identifiers introduced in an example.

-

A hyphen in code examples indicates that additional arguments to the request are provided on the line that follows.

numbers

All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radices—binary, octal, or hexadecimal—are explicitly indicated.

Monitor Utility

1

Wentworth Library

MONITOR Description

The Monitor utility (MONITOR) is a system management tool used to obtain information on operating system performance. MONITOR allows you to monitor classes of systemwide performance data (such as system I/O statistics, page management statistics, and time spent in each of the processor modes) at specifiable intervals, and produce several types of output.

To monitor a particular class of information, specify the class names corresponding to the information classes that you want to monitor. For example, to monitor page management statistics, specify the PAGE class name in the MONITOR command. MONITOR collects system performance data by class and produces the following three forms of optional output:

- A disk recording file in binary format
- Statistical terminal displays
- A disk file containing statistical summary information in ASCII format

The utility initiates a single MONITOR request for the classes of performance data specified each time you enter a command in the following form:

MONITOR [/qualifier[,...]] classname[,...] [/qualifier[,...]]

Regardless of the order in which you specify class-name parameters, MONITOR always executes requests in the following sequence:

PROCESSES
STATES
MODES
PAGE
IO
FCP
LOCK
DECNET
FILE_SYSTEM_CACHE
DISK
DLOCK
SCS
SYSTEM
CLUSTER
RMS
MSCP_SERVER
TRANSACTION
VECTOR
VBS (VAX Only)

Depending on the command qualifiers specified, MONITOR collects system performance data from the running system or plays back data recorded previously in a recording file. When you play back data, you can display it, summarize it, and even rerecord it to reduce the amount of data in the recording file.

MONITOR Usage Summary

The Monitor utility (MONITOR) is a system management tool that enables you to obtain information on operating system performance.

Format

MONITOR

Description

Issuing the MONITOR command from the DCL prompt invokes the Monitor utility and allows you to use any of the Monitor utility commands as follows:.

```
$ MONITOR  
MONITOR>
```

To begin monitoring a system, issue the MONITOR command MONITOR.

Generally, each MONITOR request runs until the time specified or implied by the /ENDING qualifier. To exit from MONITOR, enter the EXIT command at the MONITOR> prompt or press Ctrl/Z. To terminate a MONITOR request without exiting from the utility, press Ctrl/C.

Information collected by MONITOR is normally displayed as ASCII screen images. You can use the optional /DISPLAY qualifier to specify a disk file to contain the information. If you omit the file specification, output is directed to SYS\$OUTPUT. See the MONITOR command MONITOR for a discussion of the /DISPLAY qualifier.

You can also initiate MONITOR requests from command level by entering the DCL command MONITOR with the desired qualifiers and parameters. However, in terms of conserving system resources, it is preferable to initiate requests in response to the MONITOR> prompt.

MONITOR Commands

This section describes and provides examples of MONITOR commands. For commands that specify class-name parameters (other than ALL_CLASSES), a sample display or summary of each class is provided, with a brief description of the items in the class.

MONITOR recognizes the exclamation point (!) as a comment character. Thus, full- or partial-line comments are acceptable in command files specified as input to MONITOR.

Note that in MONITOR, **rate** indicates the number of occurrences per second. For example, the Page Fault rate indicates the number of page faults per second.

MONITOR Commands

Syntax

MONITOR> *command*

MONITOR Commands

CONVERT file-spec

EXECUTE (@) file-spec

EXIT

HELP [command]

INITIALIZE

MONITOR classname[,...]

SET DEFAULT classname[,...]

SHOW DEFAULT

CONVERT

The CONVERT command converts a pre-Version 5.0 MONITOR recording file to the current format.

Format

CONVERT file-spec

Parameters

file-spec

Specifies the file to be converted. The default file specification is MONITOR.DAT.

Qualifiers

/OUTPUT

The file specification of the converted file. The default specification is MONITOR.DAT.

MONITOR CONVERT

Description

You must convert pre-Version 5.0 recording files to the current format before attempting to play them back with the current MONITOR version.

Example

```
MONITOR> CONVERT 24MAY_MONITOR.DAT/OUTPUT=24MAY_NEWMON.DAT
```

The command in this example converts the file 24MAY_MONITOR.DAT to the current format and names the output file 24MAY_NEWMON.DAT.

EXECUTE (@)

The EXECUTE command or the at sign (@) executes a series of MONITOR commands contained in a file.

Format

EXECUTE (@) file-spec

Parameters

file-spec

Specifies a command file to be executed by the EXECUTE (@) command.

Qualifiers

None.

Description

With the EXECUTE command, you can direct MONITOR to obtain command input from a specified file rather than from the terminal. The file can contain any valid MONITOR command except an EXECUTE (@) command. Commands in the file are executed sequentially. If you omit the optional file specification, the default is MONITOR.MON.

After the file has executed, subsequent commands are obtained from the terminal.

Example

```
MONITOR> EXECUTE INQMEM.MON
```

```
·
```

```
MONITOR> MONITOR /RECORD
```

Contents of the file INQMEM.MON are as follows:

```
! This file sets defaults for a memory management inquiry using
! INTERVAL=5, PAGE, IO, and PROCESSES/TOPFAULT
!
```

```
·
```

```
·
```

```
SET DEFAULT /INTERVAL=5 PAGE, IO, PROCESSES/TOPFAULT
```


In this example, appropriate default values for a memory management investigation are established in the file INQMEM.MON, and the file is executed with the EXECUTE command. Then a subsequent MONITOR command uses those defaults, adding the /RECORD qualifier, to display and record the selected classes with a 5-second interval.

Note that the defaults established when the file INQMEM.MON is executed remain in effect until changed explicitly or until you exit from the utility.

EXIT

The EXIT command terminates MONITOR, returning control to command level.

Format

EXIT

Parameters

None.

Qualifiers

None.

HELP

The HELP command displays information about MONITOR.

Format

HELP [command]

Parameters

command

Specifies the name of a MONITOR command for which HELP is desired.

Qualifiers

None.

Example

```
MONITOR> HELP INITIALIZE
```

```
INITIALIZE
```

```
Re-establish initial default values for MONITOR qualifiers and class-name  
parameters.
```

```
Topic?
```

The command in this example requests help information about the INITIALIZE command.

MONITOR INITIALIZE

INITIALIZE

The INITIALIZE command reestablishes initial default settings for parameters and qualifiers previously altered by the SET DEFAULT command.

Format

INITIALIZE

Parameters

None.

Qualifiers

None.

MONITOR

The MONITOR command initiates monitoring of statistics for the classes of information you specify.

Format

MONITOR [/qualifier[,...]] classname[,...] [/qualifier[,...]]

Parameter

classname[,...]

Specifies the class of performance data to be monitored. To monitor all classes, specify the ALL_CLASSES parameter. When you specify several classes, separate the class-name parameters with commas or plus signs. You cannot specify the CLUSTER class name with any other class name. Cluster monitoring functions require that DECnet for OpenVMS be installed.

You must specify one or more of the following parameters:

| | |
|-------------------|---|
| ALL_CLASSES | Statistics for all classes |
| CLUSTER | Clusterwide performance statistics |
| DECNET | DECnet for OpenVMS statistics |
| DISK | Disk I/O statistics |
| DLOCK | Distributed lock management statistics |
| FCP | File control primitive statistics |
| FILE_SYSTEM_CACHE | File system cache statistics |
| IO | System I/O statistics |
| LOCK | Lock management statistics |
| MODES | Time spent in each of the processor modes |
| MSCP_SERVER | MSCP server statistics |
| PAGE | Page management statistics |

| | |
|----------------|---|
| PROCESSES | Statistics on all processes |
| RMS | Record Management Services statistics |
| SCS | System Communications Services statistics |
| STATES | Number of processes in each of the scheduler states |
| SYSTEM | Summary of statistics from other classes |
| TRANSACTION | DECdtm services statistics |
| VBS (VAX Only) | Virtual balance slot statistics |
| VECTOR | Vector processor scheduled usage |

This section describes qualifiers for the MONITOR and SET DEFAULT commands. Note that these commands accept the same qualifiers. As these qualifiers follow the standard rules of DCL grammar as specified in the *OpenVMS DCL Dictionary*, you can abbreviate any qualifier or keyword as long as the abbreviation is not ambiguous. Use the asterisk (*) and the percent sign (%) as wildcard characters unless otherwise noted.

Command Qualifier Descriptions

/BEGINNING=time

Specifies the time that monitoring begins, by using a combination of absolute and delta times. Observe the syntax rules for time values described in the DCL Help topic SPECIFY.

If you are monitoring a running system, and you omit the /BEGINNING qualifier, monitoring begins when you enter the MONITOR command. However, if you have specified the /INPUT qualifier to play back data from an input recording file, /BEGINNING defaults to the beginning time recorded in the input file. If you specify /BEGINNING with a time but are playing back a recording file, MONITOR selects either the beginning time of the file or the beginning time you specify, whichever is later. If you are monitoring a remote node, the local node time is used to determine beginning time.

If you specify a future time for a request to monitor a running system, MONITOR issues an informational message, and the process issuing the request hibernates until the specified time. This feature can be useful when you run MONITOR from a batch job.

/BY_NODE

/NOBY_NODE

Specifies that performance class data in a multifile summary be displayed as a single column of AVERAGE statistics for each node.

The /BY_NODE qualifier is used only to display data in a multifile summary. If you specify only one input file, MONITOR ignores the /BY_NODE qualifier because you are not performing a multifile summary.

The /BY_NODE qualifier can be specified only in combination with the /SUMMARY qualifier. One column of AVERAGE statistics per node appears for each class requested.

By default, multifile summaries include one column of AVERAGE statistics for each node requested in each input file.

**/COMMENT=string
/NOCOMMENT**

Specifies an ASCII string to be stored in the output recording file. The string can contain up to 60 characters.

The /COMMENT qualifier is valid only when /RECORD is also specified. (MONITOR ignores the /COMMENT qualifier if you do not use the /RECORD qualifier in the command line.) If you omit the qualifier or specify /NOCOMMENT, a string consisting of 60 blanks is stored in the recording file by default.

When a recording file containing a comment is played back, the comment is included in the heading of the display or single-file summary. Note that comment text is not displayed on playback for the CLUSTER class unless either the /SUMMARY or the /ALL qualifier is also used.

**/DISPLAY[=file-spec]
/NODISPLAY**

Specifies whether information collected by MONITOR is to be displayed as ASCII screen images. Optionally names the disk file to contain the output.

If you omit the optional file specification, output is written to SYS\$OUTPUT.

By default, display output is produced. Note, however, that display output is never produced when a multifile summary is requested.

/ENDING=time

Specifies the time that monitoring ends, by using a combination of absolute and delta times. Observe the syntax rules for time values described in the DCL Help topic SPECIFY.

If you are monitoring a running system and omit the /ENDING qualifier, monitoring continues until you terminate the request with Ctrl/C or Ctrl/Z. If you have also specified the /INPUT qualifier to play back data from an input recording file, /ENDING defaults to the ending time recorded in the input file. If you specify /ENDING with a time, but are playing back a recording file, MONITOR selects the earlier of the ending time of the file and the ending time you specify. For live requests, the local node's time-stamp is used to determine ending time.

You can prematurely terminate a request, regardless of the value of the /ENDING qualifier, by pressing Ctrl/C or Ctrl/Z. To prematurely terminate a request running in a noninteractive process (that is, a batch job or a detached process or subprocess), enter the appropriate DCL command to terminate the process.

/FLUSH_INTERVAL=seconds

Specifies the interval, in seconds, at which data collected by MONITOR (contents of MONITOR buffers) is written to disk. Values must be in the range of 1 through 9,999. The default interval is 300 seconds.

If you are writing data to a shared recording file currently in use, specify a short interval to ensure that others accessing the file receive data that is as current as possible. The smaller the interval, the less data is lost if a system failure occurs while recording.

/INPUT[=(file-spec,...)]

/NOINPUT

Controls whether performance data is played back from one or more input files or collected from the running system. If you specify more than one file, enclose the list in parentheses, and separate the file specifications with commas. Wildcard characters are allowed in the file specification.

Caution

Data in all files in the list must have been collected by the same OpenVMS version.

With multiple input files, you must use the **/SUMMARY** qualifier. The maximum number of files MONITOR accepts for a multifile summary is 5000. In a multifile summary request, the classes **CLUSTER** and **PROCESSES** are ignored. If these classes are the only classes specified on the command line, MONITOR does not recognize them and displays a "no classes specified" error message.

In a list of input files, any omitted segment of the file specification (name or type) is defaulted to the corresponding segment of the previous file specification.

If you omit the file type, and you have not specified the file type previously in an input file list, the default file type **.DAT** is used. If you omit the file specification, MONITOR assigns the default file name **MONITOR.DAT**. The current device and directory defaults are applied.

If you omit the qualifier, performance data is collected from the running system.

/INTERVAL=seconds

Specifies the sampling interval between data collection events, recording events, and display events. Values can range from 1 to 9,999,999.

Collection events, recording events, and display events occur within a MONITOR request. Use the **/INTERVAL** qualifier to control the frequency of these events. A collection event causes raw data for all requested classes to be collected from the operating system or from a previously recorded file. A recording event causes data for all requested classes to be written to a recording file. A display event causes a screen image to be composed, for a single class, from the accumulated data collected for that class since the beginning of the MONITOR request.

For live collection requests, a collection event is always followed immediately by a recording event (if requested). The frequency of collection/recording event pairs is controlled by the **/INTERVAL** qualifier, which specifies the number of seconds that must elapse between occurrences of the event pair. Display events occur asynchronously to collection/recording event pairs at a frequency governed by the **/VIEWING_TIME** qualifier.

For playback requests, a collection event occurs each time a new interval is encountered in the input file of previously recorded data. A recording event (if requested) does not necessarily follow immediately as it does in live collection. Its frequency is still governed by the **/INTERVAL** qualifier; the specified **/INTERVAL** value is interpreted in terms of the **/INTERVAL** value specified when the input file was created. The new value must be an integral multiple of the original value. A recording event is then triggered every time an interval is encountered in the input file that is the appropriate multiple of the original interval. For playback requests, occurrences of display events (if requested) are indicated in exactly the same way as recording events (with the **/INTERVAL** qualifier) and

immediately follow recording events (if both are specified). The actual length of time a displayed image remains on the screen is still specified with the /VIEWING_TIME qualifier, but, unlike the live collection case, this qualifier is not used to signal a display event. Table 1-1 summarizes which qualifiers cause the various MONITOR events.

Table 1-1 Relationship of MONITOR Command Qualifier to Event

| Event | Live Collection Qualifier | Playback Qualifier |
|------------|---------------------------|---|
| Collection | /INTERVAL | Original /INTERVAL value (from file) |
| Recording | /INTERVAL | /INTERVAL |
| Display | /VIEWING_TIME | /INTERVAL |

Note that, for live requests, the collection interval is defined as the number of seconds from the end of one collection event to the beginning of the next. A collection event includes collection for all requested classes on all nodes specified. (For multiple-node requests, a collection event must complete on all nodes before a new event is initiated.) Therefore, the elapsed time from the beginning of one collection event to the beginning of the next is the interval value plus the time it takes to do the collection. For some requests, notably those including many classes or the PROCESSES, RMS, CLUSTER, or SYSTEM classes, collection time can be significant.

For /INPUT requests, the interval value defaults to the value specified in the input recording file. The default for monitoring the running system is 3 seconds for all classes except ALL_CLASSES, CLUSTER, and SYSTEM, which have a default of 6 seconds.

/NODE=(nodename,...)

Specifies the nodes (up to 48 in a cluster) for which data is to be collected. If you specify more than one name, separate the names with commas, and enclose the list in parentheses.

Remote monitoring in a VMScluster may not be compatible between nodes that are running different OpenVMS versions. Table 1-2 shows the compatibility of versions for remote monitoring.

Table 1-2 Remote Monitoring Compatibility in a VMScluster

| | OpenVMS Alpha and VAX Version 6.n | OpenVMS Alpha Version 1.5 and VAX Version 5.n |
|---|--------------------------------------|--|
| OpenVMS Alpha and VAX Version 6.n | Yes | No |
| OpenVMS Alpha Version 1.5 and VAX Version 5.n | No | Yes |

To obtain data from an incompatible remote node, record the data on the remote node and then use the MONITOR playback feature to examine the data on the local node. The *OpenVMS System Manager's Manual* describes remote monitoring. If you specify multiple node names with multiple system classes, MONITOR displays one class at a time for each node. For example, the command

MONITOR/NODE=(NODE_A,NODE_B) STATES,MODES generates STATES data for NODE_A and NODE_B and then MODES data.

Note that if you specify the /ITEM class-name qualifier with the DISK or SCS classes, MONITOR displays one item at a time for each node.

/OUTPUT=file-spec

Used with the CONVERT command, this qualifier specifies the name of the converted recording file. The default specification is MONITOR.DAT. File lists are not permitted.

Recording files produced using MONITOR prior to VMS Version 5.0 must be converted to the current format before they can be played back by the current MONITOR version.

/RECORD[=file-spec]

/NORECORD

Specifies that a binary disk file be created containing all collected data for the request. Note that recording is restricted to files on disks. No wildcard characters are allowed in the file specification. If you omit the file type, the default file type is .DAT. If you omit the file specification, output is generated to a file named MONITOR.DAT in the current default device and directory. If you specify an existing file but omit the version number, a new version of the file is created.

The output consists of all data for the requested classes, regardless of the class-name qualifiers specified. Note that recording file output is not produced when a multifile summary is requested.

By default, no recording file output is produced.

/SUMMARY[=file-spec]

/NOSUMMARY

Specifies that an ASCII disk file be created containing summary statistics on all data collected for this request. If the optional file specification is omitted, it defaults to MONITOR.SUM. By default, no summary output is produced.

The summary file, generated at the end of monitoring, contains one or more pages of output for each requested class. The format of each page is similar to that of display output and is determined by the class-name qualifiers. The /ALL qualifier is applied to all class names for which no other qualifier is specified.

/VIEWING_TIME=seconds

Specifies the duration for each screen image display for /DISPLAY requests. Values can range from 1 to 9,999,999.

If you are monitoring the running system, /VIEWING_TIME defaults to the /INTERVAL value. If you specify /INPUT, and you are monitoring a recording file, /VIEWING_TIME defaults to 3 seconds.

Effective viewing time varies, however, depending on whether you are running MONITOR on your local system or on a remote node. (*Remote* in this context refers to the use of the SET HOST command to access another node.) For remote access, the time required to display the screen is included in the viewing time, while for local access, this time is not included. Therefore, use a larger viewing time than the 3-second default when running MONITOR on a remote system. The value appropriate for remote access depends on your terminal baud rate. For a 9600-baud terminal line, 6 seconds is a reasonable viewing time.

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Note also that the time between full screens of data for the PROCESSES display is controlled by this qualifier.

MONITOR ALL_CLASSES

The MONITOR ALL_CLASSES command initiates monitoring of statistics for all classes except the CLUSTER and RMS classes.

Format

MONITOR ALL_CLASSES

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

If you do not specify any qualifiers with the ALL_CLASSES parameter, normal default output is produced for each class. The qualifiers have no effect on display of the PROCESSES class.

Note that the default interval is 6 seconds.

The MONITOR ALL_CLASSES command is particularly useful for playback of recording files because it eliminates the need to specify the particular classes of performance data the recording file contains. To override any of the default qualifiers, specify the class name with the qualifier after specifying ALL_CLASSES.

Example

```
MONITOR> MONITOR/INPUT=SYS$MANAGER:LOADBAL.DAT ALL_CLASSES, PROCESSES/TOPCPU
```

This command initiates playback of the recording file SYS\$MANAGER:LOADBAL.DAT. All data contained in the file will be displayed.

MONITOR CLUSTER

The MONITOR CLUSTER command initiates monitoring of the CLUSTER statistics class, which shows clusterwide CPU, memory, disk, and locking activity.

Format

MONITOR CLUSTER

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

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MONITOR CLUSTER

Description

For the CLUSTER class, MONITOR collects data items for up to 48 nodes in a cluster. Because this class combines the most significant clusterwide performance statistics in a single display, it is particularly useful to cluster managers and other users seeking an overview of cluster activity.

MONITOR does not recognize nodes that enter the cluster while a request is active. MONITOR, therefore, does not collect data for these nodes.

You cannot specify the CLUSTER class in the same request with any other class.

In a multifile summary request, the classes CLUSTER and PROCESSES are ignored. If these classes are the only classes specified on the command line, MONITOR does not recognize them and displays a "no classes specified" error message. MONITOR does not recognize these classes if they are the only classes specified on the command line, and displays a "no classes specified" error message.

The CLUSTER class includes the following data items:

- CPU Busy—Percentage of CPU in use; includes activity in all processor modes (except Idle Time) for each node.
- Percent Memory In Use—Memory in use on each node; calculated by dividing the Free List Size by total available memory and subtracting the result from 100%.
- I/O Operation Rate—Total rate of disk I/O operations on each disk by all nodes currently active in the request.

In cluster configurations, the MSCP server software makes locally attached and HSC disks available to other nodes. A node uses *remote* access to a disk when it accesses the disk through another VAX node (using the MSCP server). A node uses *direct* access to a disk when it directly accesses a locally attached or HSC disk.

An "R" following the device name indicates that the displayed statistics represent I/O operations requested by nodes using remote access.

If an "R" does not appear after the device name, the displayed statistics represent I/O operations issued by nodes with direct access. These I/O operations might include those issued by the MSCP server on behalf of remote requests.

- Total ENQ/DEQ Rate—Sum of all local, incoming, and outgoing ENQs, DEQs, and conversions.

Two display formats are provided, depending on the class-name qualifier specified:

- A tabular style format for the /ALL qualifier
- A bar graph style format for the /AVERAGE, /CURRENT, /MAXIMUM, and /MINIMUM qualifiers

Note to Cluster Managers on MONITOR_SERVER Process

When users enter the MONITOR CLUSTER command, MONITOR activates the image SYS\$SYSTEM:VPM.EXE, which creates a process called MONITOR_SERVER on each active cluster node. (If users specify the /NODE qualifier with the MONITOR CLUSTER command or with any command of the form MONITOR class name, MONITOR creates the process only on the specified nodes.) The server process gathers data from remote nodes for live display or to record on the local node. To ensure accurate and timely data collection, the process is started at priority 15. Because server processes consume minimal resources, they have no significant effect on system performance.

By default, MONITOR_SERVER processes are started in the system DECNET account, which is created when the NETCONFIG.COM command procedure executes at bootstrap time. If this account is not present on your system, you must either create it by executing NETCONFIG.COM, or specify another account in which the server processes can be started.

If you want to start the processes in another account, use the following sequence of commands to define VPM as known object 51 in the DECnet database and associate the object with the desired account:

```
$ SET PROCESS/PRIVILEGE=SYSPRV
$ RUN SYS$SYSTEM:NCP
NCP> DEFINE OBJECT VPM NUMBER 51 -
_ FILE SYS$SYSTEM:VPM.EXE -
_ PROXY NONE -
_ ACCOUNT account -
_ USER user-id -
_ PASSWORD password
NCP> SET OBJECT VPM NUMBER 51 -
_ FILE SYS$SYSTEM:VPM.EXE -
_ PROXY NONE -
_ ACCOUNT account -
_ USERNAME user-id -
_ PASSWORD password
NCP> EXIT
$ SET PROCESS/PRIVILEGE=NOSYSPRV
```

For each server process, MONITOR creates a log file on the local node to which information on server connection activity, including error messages, is written. Note that error messages are written to the file only when errors occur. A single version is maintained for the life of the system. The default file specification has the form SYS\$COMMON:[SYSMGR]VPM\$nodename.LOG. The node name portion of the specification identifies the node on which the MONITOR_SERVER process has been started.

If you want to change the default specification, you can redefine the executive-mode logical name VPM\$LOG_FILE in the system logical name table on the appropriate nodes. For example, if you wanted to write server error logging data to the file WRKD:[MONSERVER]VPM_ERRORS.LOG, you would define VPM\$LOG_FILE as follows:

```
$ DEFINE/SYSTEM/EXECUTIVE_MODE VPM$LOG_FILE -
_ $ WRKD:[MONSERVER]VPM_ERRORS.LOG
```

To direct to a single file data for all MONITOR_SERVER processes on the cluster, you could assign the logical name the same value on each member system. Note that because the log files are created as shared sequential files, multiple server processes can access them simultaneously.

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If you routinely monitor your cluster, you can reduce server startup time significantly by creating MONITOR_SERVER processes on each member node at bootstrap time and maintaining the processes for the life of the system. To do so, add the following lines to the appropriate site-independent startup command files:

```
$ DEFINE/SYSTEM/EXECUTIVE_MODE VPM$SERVER_LIVE TRUE
$ RUN/DETACH/PAGE_FILE=10000 SYSS$SYSTEM:VPM.EXE
```

You can enter these commands interactively at any time if you have the following privileges: ALTPRI, NETMBX, PSWAPM, SYSNAM, SYSPRV, and TMPMBX.

Example

```
MONITOR> MONITOR CLUSTER/ALL
```

```
OpenVMS Monitor Utility
CLUSTER STATISTICS
on node CURLEY
29-APR-1995 12:25:13
```

| CPU Busy | CUR | AVE | MIN | MAX |
|----------|--------|--------|--------|--------|
| LARRY | 100.00 | 100.00 | 100.00 | 100.00 |
| CURLEY | 100.00 | 99.83 | 100.00 | 100.00 |
| MOE | 8.52 | 8.50 | 8.52 | 8.52 |

```
OpenVMS Monitor Utility
CLUSTER STATISTICS
on node CURLEY
29-APR-1995 12:25:19
```

| %Memory In Use | CUR | AVE | MIN | MAX |
|----------------|-------|-------|-------|-------|
| MOE | 88.00 | 88.00 | 88.00 | 88.00 |
| LARRY | 78.00 | 78.00 | 77.00 | 78.00 |
| CURLEY | 72.00 | 72.50 | 72.00 | 72.00 |

```
OpenVMS Monitor Utility
CLUSTER STATISTICS
on node CURLEY
29-APR-1995 12:25:25
```

| I/O Operation Rate | CUR | AVE | MIN | MAX |
|-------------------------------------|------|------|------|-------|
| \$111\$DUA7: (DECEIT) SQMCLUSTERV4 | 0.48 | 6.53 | 0.48 | 10.41 |
| \$111\$DUA6: (DECEIT) QUALD | 1.93 | 1.07 | 0.00 | 1.93 |
| \$111\$DUA4: (DECEIT) PAGESWAPDISK | 1.44 | 0.96 | 0.00 | 1.44 |
| \$111\$DUA2: (DECEIT) TSDPERF | 0.32 | 0.53 | 0.16 | 1.12 |
| LARRY\$DRA3: QUALQUEST | 0.00 | 0.21 | 0.00 | 0.64 |
| MOE\$DMA1: UVMSQAR | 0.00 | 0.00 | 0.00 | 0.00 |
| MOE\$DRA5: USER01 | 0.00 | 0.00 | 0.00 | 0.00 |
| LARRY\$DRA4: TIMEDEV | 0.00 | 0.00 | 0.00 | 0.00 |
| LARRY\$DBB3: REGLIB | 0.00 | 0.00 | 0.00 | 0.00 |
| \$111\$DUA3: (DECEIT) DUMPDISK | 0.00 | 0.00 | 0.00 | 0.00 |
| \$111\$DUA5: (DECEIT) BPMDISK | 0.00 | 0.00 | 0.00 | 0.00 |
| \$111\$DJA8: (DECEIT) ORLEAN | 0.00 | 0.00 | 0.00 | 0.00 |
| \$111\$DJA10: (DECEIT) QMISDATABASE | 0.00 | 0.00 | 0.00 | 0.00 |
| \$111\$DJA9: (DECEIT) MPI\$DATA | 0.00 | 0.00 | 0.00 | 0.00 |

```
OpenVMS Monitor Utility
CLUSTER STATISTICS
on node CURLEY
29-APR-1995 12:25:56
```

| Tot ENQ/DEQ Rate | CUR | AVE | MIN | MAX |
|------------------|-----|-----|-----|-----|
|------------------|-----|-----|-----|-----|

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| | | | | |
|--------|-------|-------|------|-------|
| MOE | 7.90 | 14.92 | 0.00 | 43.12 |
| LARRY | 20.48 | 14.64 | 0.00 | 46.92 |
| CURLEY | 1.93 | 13.29 | 0.00 | 57.30 |

This example shows the tabular style format for the CLUSTER display.

MONITOR DECNET

The MONITOR DECNET command initiates monitoring of the DECNET class, which includes information on DECnet for OpenVMS network activity.

Format

MONITOR DECNET

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The DECNET class consists of the following data items:

- Arriving Local Packet Rate—Rate at which local packets are being received
- Departing Local Packet Rate—Rate at which local packets are being sent
- Arriving Transit Packet Rate—Rate at which transit packets are arriving
- Transit Congestion Loss Rate—Rate of transit congestion loss

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- Receiver Buffer Failure Rate—Rate of receiver buffer failures

Example

```
MONITOR> MONITOR DECNET
```

```
OpenVMS Monitor Utility  
DECNET STATISTICS  
on node SAMPLE  
29-APR-1995 22:22:44
```

| | CUR | AVE | MIN | MAX |
|-----------------------------|------|------|------|-------|
| Arriving Local Packet Rate | 9.54 | 5.08 | 0.00 | 11.25 |
| Departing Local Packet Rate | 9.22 | 4.66 | 0.00 | 10.92 |
| Arriving Trans Packet Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Trans Congestion Loss Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Receiver Buff Failure Rate | 0.00 | 0.00 | 0.00 | 0.00 |

This example shows that arriving and departing network packet rates (including control packets) are roughly equivalent, and that network activity is currently at a level higher than the average since monitoring began, but not at its highest point.

MONITOR DISK

The MONITOR DISK command initiates monitoring of the DISK statistics class. The maximum number of disks that can be monitored for record output is 909, and for display and summary output is 1817.

Format

```
MONITOR DISK
```

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/ITEM=(keyword[,...])

Selects one or more data items for inclusion in display and summary output. If you specify two or more keywords, enclose them in parentheses, and separate them with commas. When the /ITEM qualifier is omitted, the default is /ITEM=OPERATION_RATE.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

/PERCENT

/NOPERCENT

Controls whether statistics are expressed as percent values in display and summary output. The /PERCENT qualifier is applicable only to the DISK, MODES, SCS, and STATES classes. By default, statistics are not expressed as percent values.

/ITEM Qualifier Keywords

ALL

Specifies that statistics on all data items collected for the disks are displayed on successive screens.

OPERATION_RATE

Specifies that I/O operation rate statistics are displayed for each disk.

QUEUE_LENGTH

Specifies that the number of I/O request packets being serviced (current or waiting) is displayed for each disk.

Description

The DISK class is a component class. Data items for this class are collected for each mounted disk device in a single-node or cluster system. The DISK class consists of the following data items:

- I/O Operation Rate—Rate at which I/O operations occur on each disk. By comparing operation rates for all disks in the system, you can tell which disks are busy and which are idle. However, because this statistic does not provide information on the time required for individual operations, use discretion in interpreting it.
- I/O Request Queue Length—Number of outstanding I/O request packets. Includes the request currently being serviced and those awaiting service. Note that, for greater precision, this item is always sampled at a 1-second interval, regardless of the value specified with the /INTERVAL command qualifier.

MONITOR MONITOR DISK

The maximum number of disks that can be monitored is 909 for record output and 1817 for display or summary output. In previous versions, the limit was 799 disks for both types of output.

In the following example, typical of a cluster environment, note that each disk is identified by three elements:

- Disk name ending in a colon.
- Name of the cluster node through which the disk is accessed. This field appears only in the multiple-statistic display; it is not included in single-statistic displays or multifile summaries.
- Volume label.

In cluster configurations, the MSCP server software makes locally attached and HSC disks available to other nodes. A node uses *remote* access to a disk when it accesses the disk through another VAX node (using the MSCP server). A node uses *direct* access to a disk when it directly accesses a locally attached or HSC disk.

An "R" following the device name indicates that the displayed statistics represent I/O operations requested by nodes using remote access.

If an "R" does not appear after the device name, the displayed statistics represent I/O operations issued by nodes with direct access. These I/O operations might include those issued by the MSCP server on behalf of remote requests.

Example

```
MONITOR> MONITOR DISK/ITEM=QUEUE_LENGTH
```

```
OpenVMS Monitor Utility  
DISK I/O STATISTICS  
on node SAMPLE  
29-APR-1995 14:19:56
```

| I/O Request | Queue Length | CUR | AVE | MIN | MAX |
|---------------|----------------------|------|------|------|------|
| SAMPLE\$DBA0: | SAMPLE09APR | 0.00 | 0.00 | 0.00 | 0.00 |
| SAMPLE\$DRA2: | SAMPLEPAGE | 2.00 | 1.43 | 0.00 | 4.00 |
| SAMPLE\$DRB1: | ACCREG | 0.00 | 0.00 | 0.00 | 0.00 |
| \$1\$DRA5: | (MOE) MOE\$\$PAGE | 0.00 | 0.00 | 0.00 | 0.00 |
| \$1\$DBA3: | (CURLEY) UMASTER | 0.00 | 0.00 | 0.00 | 0.00 |
| \$1\$DBA5: | (CURLEY) MIDNITE | 0.00 | 0.00 | 0.00 | 0.00 |
| \$2\$DRA7: | (LARRY) RES26APR | 0.00 | 0.00 | 0.00 | 0.00 |
| \$2\$DRB6: | (LARRY) CLUSTERDUMP1 | 0.00 | 0.00 | 0.00 | 0.00 |
| \$255\$DUA4: | (SHEMP) RES06AUG | 0.00 | 0.00 | 0.00 | 0.00 |
| \$255\$DUA5: | (SHEMP) VMSDOCLIB | 0.00 | 0.00 | 0.00 | 0.00 |

This example, typical of a cluster environment, shows the number of I/O packets awaiting service or in service for each disk. Note that the device SAMPLE\$DRA2 is the only device with a nonzero queue length. Because MONITOR samples queue lengths every second, regardless of the collection interval value, the precision of the data does not depend on the collection interval.

MONITOR DLOCK

The MONITOR DLOCK command initiates monitoring of the DLOCK (distributed lock management) statistics class.

Format

MONITOR DLOCK

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The DLOCK class is useful for monitoring the lock management subsystem in a cluster environment. The class consists of the following data items:

- New ENQ Rate (Local)—Rate of new lock (ENQ) requests that originate and are performed on this system
- New ENQ Rate (Incoming)—Rate of new lock requests that originate on other systems and are performed on this system
- New ENQ Rate (Outgoing)—Rate of new lock requests that originate on this system and are performed on another system
- Converted ENQ Rate (Local)—Rate of lock (ENQ) conversion requests that originate and are performed on this system

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- Converted ENQ Rate (Incoming)—Rate of lock conversion requests that originate on other systems and are performed on this system
- Converted ENQ Rate (Outgoing)—Rate of lock conversion requests that originate on this system and are performed on another system
- DEQ Rate (Local)—Rate of unlock (DEQ) requests that originate and are performed on this system
- DEQ Rate (Incoming)—Rate of unlock requests that originate on other systems and are performed on this system
- DEQ Rate (Outgoing)—Rate of unlock requests that originate on this system and are performed on another system
- Blocking AST Rate (Local)—Rate of lock manager blocking ASTs that originate and are performed on this system
- Blocking AST Rate (Incoming)—Rate of lock manager blocking ASTs that originate on other systems and are performed on this system
- Blocking AST Rate (Outgoing)—Rate of lock manager blocking ASTs that originate on this system and are performed on another system
- Directory Function Rate (Incoming)—Rate of requests for locks being managed by this node
- Directory Function Rate (Outgoing)—Rate of requests for locks being managed by other nodes
- Deadlock Message Rate—Rate of incoming and outgoing messages required for deadlock detection

Example

MONITOR> MONITOR DLOCK

OpenVMS Monitor Utility
DISTRIBUTED LOCK MANAGEMENT STATISTICS
on node SAMPLE
29-APR-1995 11:02:20

| | | CUR | AVE | MIN | MAX |
|-----------------------|------------|-------|-------|------|-------|
| New ENQ Rate | (Local) | 15.84 | 11.59 | 1.54 | 26.88 |
| | (Incoming) | 1.67 | 2.62 | 0.11 | 25.05 |
| | (Outgoing) | 0.05 | 0.63 | 0.00 | 5.99 |
| Converted ENQ Rate | (Local) | 23.67 | 9.13 | 0.99 | 41.22 |
| | (Incoming) | 4.48 | 5.71 | 0.00 | 70.19 |
| | (Outgoing) | 0.00 | 1.43 | 0.00 | 15.90 |
| DEQ Rate | (Local) | 15.86 | 11.58 | 1.64 | 26.68 |
| | (Incoming) | 1.66 | 2.59 | 0.00 | 24.85 |
| | (Outgoing) | 0.05 | 0.63 | 0.00 | 5.99 |
| Blocking AST Rate | (Local) | 0.00 | 0.00 | 0.00 | 0.01 |
| | (Incoming) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (Outgoing) | 0.00 | 0.00 | 0.00 | 0.00 |
| Dir Functn Rate | (Incoming) | 8.00 | 7.33 | 4.66 | 11.00 |
| | (Outgoing) | 1.00 | 0.77 | 0.00 | 2.66 |
| Deadlock Message Rate | | 0.00 | 0.00 | 0.00 | 0.00 |

This example shows that most of the current lock management activity occurs locally, but that, at some point during the monitoring period, a significant amount of incoming activity occurred.

MONITOR FCP

The MONITOR FCP command initiates monitoring of the File Control Primitive statistics class, which includes information on all Files-11 Ancillary Control Processes (ACPs) and Extended QIO Programs (XQPs) on the local node.

Format

MONITOR FCP

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The FCP class consists of the following data items, all of which are displayed as occurrences per second:

- FCP Call Rate—Rate of QIO requests received by the file system.
- Allocation Rate—Rate of calls that caused allocation of disk space.
- Create Rate—Rate at which new files were created.
- Disk Read Rate—Rate of read I/O operations from disk by the file system.
- Disk Write Rate—Rate of write I/O operations to disk by the file system.

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- Volume Lock Wait Rate—Rate of entry into a wait state due to contention for a volume synchronization lock. Volume synchronization locks are removed by the XQP during file creation, deletion, extension, and truncation operations.
- CPU Tick Rate—Rate at which CPU time was used by the file system (in 10-millisecond ticks).
- File System Page Fault Rate—Rate at which page faults occurred in the file system.
- Window Turn Rate—Rate of file-map window misses.
- File Lookup Rate—Rate of file name lookup operations in file directories.
- File Open Rate—Rate at which files were opened.
- Erase Rate—Rate of erase operations issued by the file system.

Example

```
MONITOR> MONITOR /INTERVAL=10 FCP
```

```
OpenVMS Monitor Utility  
FILE PRIMITIVE STATISTICS  
on node SAMPLE  
29-APR-1995 16:13:38
```

| | CUR | AVE | MIN | MAX |
|--------------------------|------|------|------|-------|
| FCP Call Rate | 4.62 | 3.80 | 0.33 | 7.61 |
| Allocation Rate | 0.99 | 0.24 | 0.00 | 0.99 |
| Create Rate | 2.31 | 0.57 | 0.00 | 2.31 |
| Disk Read Rate | 1.98 | 2.48 | 0.33 | 6.95 |
| Disk Write Rate | 3.30 | 2.39 | 0.33 | 5.62 |
| Volume Lock Wait Rate | 4.62 | 3.06 | 0.00 | 6.95 |
| CPU Tick Rate | 3.63 | 3.88 | 0.33 | 10.26 |
| File Sys Page Fault Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Window Turn Rate | 1.98 | 0.99 | 0.00 | 1.98 |
| File Lookup Rate | 0.33 | 1.40 | 0.00 | 4.63 |
| File Open Rate | 2.00 | 3.54 | 2.00 | 5.10 |
| Erase Rate | 0.00 | 0.00 | 0.00 | 0.00 |

This example shows that the rate of files opened during the last 10-second collection interval was 2.0 (for a total of 20). The average rate since the MONITOR command was entered is 3.54; the highest rate achieved during any 10-second interval is 5.10, and the lowest rate of 2.0 occurred during the last interval.

MONITOR FILE_SYSTEM_CACHE

The MONITOR FILE_SYSTEM_CACHE command initiates monitoring of the FILE_SYSTEM_CACHE statistics class.

Format

```
MONITOR FILE_SYSTEM_CACHE
```


Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The FILE_SYSTEM_CACHE class includes the following data items:

- Directory FCB Hit%—Percentage of directory file control block hits on the directory cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.
- Directory FCB Attempt Rate—Rate at which attempts were made to find directory file control blocks in the directory cache.
- Directory Data Hit%—Percentage of directory data hits on the directory cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.
- Directory Data Attempt Rate—Rate at which attempts were made to find directory data in the directory cache.
- File Header Hit%—Percentage of file header hits on the file header cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.
- File Header Attempt Rate—Rate at which attempts were made to find file headers in the file header cache.
- File ID Hit%—Percentage of file identifier hits on the file ID cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.

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- File ID Cache Attempt Rate—Rate at which attempts were made to find file identifiers in the file ID cache.
- Extent Cache Hit%—Percentage of appropriate size extent hits on the extent cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.
- Extent Cache Attempt Rate—Rate at which attempts were made to find appropriate size extents in the extent cache.
- Quota Cache Hit%—Percentage of quota entry hits on the quota cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.
- Quota Cache Attempt Rate—Rate at which attempts were made to find entries in the quota cache.
- Bitmap Cache Hit%—Percentage of entry hits on the bitmap cache. The percentage value shown is the ratio of hits to the sum of hits plus misses.
- Bitmap Cache Attempt Rate—Rate at which attempts were made to find entries in the bitmap cache.

Note that all items shown in the FILE_SYSTEM_CACHE display, except Dir FCB, apply only to XQPs. The Dir FCB item applies to both XQPs and the ODS-1 ACP.

Example

MONITOR> MONITOR FILE_SYSTEM_CACHE

OpenVMS Monitor Utility
FILE SYSTEM CACHING STATISTICS
on node SAMPLE
29-APR-1995 13:08:53

| | | CUR | AVE | MIN | MAX |
|----------|----------------|--------|--------|------|--------|
| Dir FCB | (Hit %) | 100.00 | 100.00 | 0.00 | 100.00 |
| | (Attempt Rate) | 1.66 | 0.49 | 0.00 | 1.66 |
| Dir Data | (Hit %) | 100.00 | 100.00 | 0.00 | 100.00 |
| | (Attempt Rate) | 4.66 | 1.24 | 0.00 | 4.66 |
| File Hdr | (Hit %) | 66.00 | 80.00 | 0.00 | 100.00 |
| | (Attempt Rate) | 1.00 | 0.41 | 0.00 | 1.00 |
| File ID | (Hit %) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (Attempt Rate) | 0.00 | 0.00 | 0.00 | 0.00 |
| Extent | (Hit %) | 0.00 | 100.00 | 0.00 | 100.00 |
| | (Attempt Rate) | 0.00 | 0.24 | 0.00 | 1.00 |
| Quota | (Hit %) | 0.00 | 100.00 | 0.00 | 100.00 |
| | (Attempt Rate) | 0.00 | 0.16 | 0.00 | 0.66 |
| Bitmap | (Hit %) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (Attempt Rate) | 0.00 | 0.00 | 0.00 | 0.00 |

The cache hits and misses reflect the effectiveness of file system caching. Generally, the size of the cache affects the hit rate. The Attempt Rate is the sum of hits plus misses; the Hit% is the percentage of attempts that were successful.

Unlike other MONITOR data items, the averages for the hit percentages are not calculated based on previous hit percentages. Instead, these values are calculated based on the total number of hits and the total number of attempts on a cache since the beginning of the Monitor request. This provides more accurate average values for the hit percentage items.

The **directory FCB cache** is checked whenever a directory lookup is performed. Directory lookups can be performed on file open, creation, deletion, extension, or truncation. If the file control block associated with the directory is found in the cache, a hit is recorded. Otherwise, a miss is recorded. Both hits and misses are counted as attempts.

The **directory data cache** is checked whenever a file lookup is performed. Directory lookups may be performed on file open, creation, deletion, extension, or truncation. If an entry for the file being accessed is found in the directory data cache, a hit is recorded. Otherwise, a miss is recorded. Both hits and misses are counted as attempts.

The **file header cache** is checked on file open, close, creation, deletion, extension, or truncation. If the file header for the file being accessed is found in the file header cache, a hit is recorded. Otherwise, a miss is recorded. Both hits and misses are counted as attempts.

The **file identification cache** is a list of file identifiers that are removed on file creation and returned on file deletion. The File ID hits indicate file numbers successfully removed or returned to the file ID cache. Otherwise, a miss is recorded. Both hits and misses are counted as attempts.

The **extent cache** is checked on file creation, deletion, extension, and truncation. An attempt is made to allocate space from the extent cache during file creation or extension. During file creation, if sufficient size is found, a hit is recorded. If the desired size is not found, or an entry is forced to be split, an attempt is recorded. During file deletion, if the blocks were returned to the cache without the extent cache becoming too large, a hit is recorded. Otherwise, a miss is recorded. Both hits and misses are counted as attempts.

If quota checking is enabled, the **quota cache** is checked on file creation, deletion, extension, and truncation. If the desired entry (the identifier matching that of the requester) is found in the quota cache, a hit is recorded. Otherwise, a miss is recorded. Both hits and misses are counted as attempts.

The **bitmap cache** contains blocks from the storage bitmap file. This cache is accessed when the extent cache cannot satisfy requests for disk space. High rates indicate fragmented volumes.

Data items in the FILE_SYSTEM_CACHE display correspond to SYSGEN ACP/XQP parameters, as follows:

| FILE_SYSTEM_CACHE Item | ACP/XQP Parameters |
|------------------------|------------------------------|
| Dir FCB | ACP_SYSACC ACP_DINDXCACHE |
| Dir Data | ACP_DIRCACHE |
| File Hdr | ACP_HDRCACHE |
| File ID | ACP_FIDCACHE |
| Extent | ACP_EXTCACHE ACP_EXTLIMIT |
| Quota | ACP_QUOCACHE |
| Bitmap | ACP_MAPCACHE |

MONITOR

MONITOR FILE_SYSTEM_CACHE

When you change the ACP/XQP cache parameters, remember to reboot the system to make the changes effective. For more information on these parameters, refer to the appendix on system parameters.

MONITOR IO

The MONITOR IO command initiates monitoring of the I/O class.

Format

MONITOR IO

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The IO class includes the following data items:

- Direct I/O Rate—Rate of direct I/O (for example, disk and tape) operations
- Buffered I/O Rate—Rate of buffered I/O (for example, terminal and line printer) operations
- Mailbox Write Rate—Rate of write-to-mailbox requests received by the system
- Split Transfer Rate—Rate at which transfers were split into multiple I/Os
- Log Name Translation Rate—Rate of logical name translations

- File Open Rate—Rate at which files were opened
- Page Fault Rate—Rate of occurrence of page faults for all working sets
- Page Read Rate—Rate of pages read from disk as a result of page faults
- Page Read I/O Rate—Rate of read I/O operations from disk as a result of page faults
- Page Write Rate—Rate of pages written to the page file
- Page Write I/O Rate—Rate of write I/O operations to the page file
- Inswap Rate—Rate at which working sets were read into memory from the swap file
- Free List Size—Number of pages on the free page list
- Modified List Size—Number of pages on the modified page list

Example

MONITOR> MONITOR /RECORD IO

OpenVMS Monitor Utility
I/O SYSTEM STATISTICS
on node SAMPLE
29-APR-1995 22:22:44

| | CUR | AVE | MIN | MAX |
|---------------------------|---------|---------|---------|---------|
| Direct I/O Rate | 15.33 | 4.46 | 0.33 | 15.33 |
| Buffered I/O Rate | 24.91 | 47.47 | 24.91 | 69.00 |
| Mailbox Write Rate | 0.00 | 0.45 | 0.00 | 2.95 |
| Split Transfer Rate | 1.66 | 1.56 | 0.33 | 3.97 |
| Log Name Translation Rate | 13.28 | 10.75 | 3.66 | 27.66 |
| File Open Rate | 1.66 | 1.26 | 0.33 | 2.98 |
| Page Fault Rate | 24.58 | 52.31 | 17.33 | 178.00 |
| Page Read Rate | 12.29 | 9.00 | 0.00 | 26.88 |
| Page Read I/O Rate | 2.65 | 2.43 | 0.00 | 6.22 |
| Page Write Rate | 0.00 | 6.69 | 0.00 | 58.66 |
| Page Write I/O Rate | 0.00 | 0.27 | 0.00 | 1.66 |
| Inswap Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Free List Size | 3621.00 | 3604.09 | 3392.00 | 3771.00 |
| Modified List Size | 49.00 | 73.36 | 4.00 | 181.00 |

RECORDING

This example shows that the direct I/O rate is currently at its highest level since the MONITOR command was entered and is significantly higher than the average rate. Termination of this command by Ctrl/C and entry of a MONITOR PROCESSES/TOPDIO command would show the top users of direct I/Os. Note that if I/O monitoring is begun at a later time, a new MONITOR request is defined. That is, it is not a continuation of the original request; the average, minimum, and maximum statistics are reinitialized. However, because the original request specified recording, that data can be played back for redisplay or summarization.

MONITOR LOCK

The **MONITOR LOCK** command initiates monitoring of the **LOCK** class.

Format

MONITOR LOCK

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the **Command Qualifier Descriptions** section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except **CLUSTER**, **MODES**, **PROCESSES**, **STATES**, **SYSTEM**, and **VECTOR**.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The **/CURRENT** qualifier is the default for the **CLUSTER**, **MODES**, **STATES**, **SYSTEM**, and **VECTOR** classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The **LOCK** class includes the following data items:

- **New ENQ Rate**—Rate of new lock (ENQ) requests (as opposed to conversions)
- **Converted ENQ Rate**—Rate of lock (ENQ) conversion requests
- **DEQ Rate**—Rate of unlock (DEQ) requests
- **Blocking AST Rate**—Rate of lock manager blocking ASTs delivered
- **ENQs Forced To Wait Rate**—Rate of occurrence of locks that could not be granted immediately, thus having to wait
- **ENQs Not Queued Rate**—Rate of occurrence of locks that could not be granted immediately but requested not to be queued, and thus received an error status instead

- Deadlock Search Rate—Rate at which a deadlock search was performed
- Deadlock Find Rate—Rate at which a deadlock was found
- Total Locks—Total number of locks in the system
- Total Resources—Total number of resources in the system

Example

```
MONITOR> MONITOR /INPUT=LOCKSTATS.DAT/SUMMARY/NODISPLAY LOCK/AVERAGE
```

```
MONITOR> Ctrl/Z  
$ TYPE MONITOR.SUM
```

```

                                OpenVMS Monitor Utility
                                LOCK MANAGEMENT STATISTICS
                                on node SAMPLE
                                SUMMARY
                                From: 29-APR-1995 08:00:00
                                To:   29-APR-1995 17:00:00

                                0      5      10     15     20
                                +-----+-----+-----+-----+
New ENQ Rate                   2 | ****
Converted ENQ Rate             1 | **
DEQ Rate                       3 | *****
Blocking AST Rate              |
ENQs Forced To Wait Rate       |
ENQs Not Queued Rate           |
Deadlock Search Rate           |
Deadlock Find Rate             |
Total Locks                    3 | *****
Total Resources                 3 | *****
                                |
PLAYBACK                       +-----+-----+-----+-----+
                                SUMMARIZING

```

This example shows the average use of the lock management subsystem during a typical workday, based on data that was previously recorded.

MONITOR MODES

The MONITOR MODES command initiates monitoring of the MODES class, which includes a data item for each mode of processor operation.

Format

```
MONITOR MODES
```

Command Qualifiers

```
/qualifier[,...]
```

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CPU

NOCPU [= (x[,...])]

In multiprocessor configurations, selects the CPU-specific form of output, where *x* specifies the CPU identification. If you specify /CPU without specifying a CPU identification, MONITOR displays MODES class statistics for each successive CPU until information for all active CPUs has been displayed. MONITOR then repeats the cycle beginning with the first CPU. If you specify one CPU identification, MONITOR displays statistics for that CPU only. If you specify multiple CPU identifications, MONITOR displays statistics for each successive CPU specified, then repeats the cycle beginning with the first specified CPU. Note that if you specify multiple CPU identifications, MONITOR does not notify you if one or more of the specified CPUs is unavailable. If all of the CPU identifications that you specify do not exist, then MONITOR will behave as if /CPU were specified without any arguments.

The default is /NOCPU. For multiprocessor systems, /NOCPU produces a single modes screen that reflects the combined time that all CPUs spent in each mode.

For nonmultiprocessor systems, the /CPU qualifier causes the CPU ID to be displayed, while /NOCPU does not display the CPU ID.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

/PERCENT

/NOPERCENT

Controls whether statistics are expressed as percent values in display and summary output. The PERCENT\NOPERCENT qualifier is applicable only to the DISK, MODES, SCS, and STATES classes. By default, statistics are not expressed as percent values.

Description

The following data items, included by the MODES class, can be displayed as percentages of all processor (CPU) time or as rates of clock ticks (10 millisecond units) per second:

- Interrupt Stack (Interrupt State on Alpha systems)—Time spent on the interrupt stack (on VAX systems) or in an interrupt state on a kernel stack (on Alpha systems).
- MP Synchronization—Time spent synchronizing multiple CPUs (applicable to multiprocessor systems only).
- Kernel Mode—Time spent in kernel mode, but not in an interrupt state.
- Executive Mode—Time spent in executive mode.
- Supervisor Mode—Time spent in supervisor mode.
- User Mode—Time spent in user mode executing instructions.
- Compatibility Mode—Time spent executing compatibility mode instructions. (This data item is only meaningful for VAX systems.)
- Idle Time—Time not spent in any of the other modes.

For multiprocessor systems, when you enter the MONITOR MODES command without using the /CPU qualifier to select specific CPUs, MONITOR produces a single modes screen similar to those produced for nonmultiprocessor systems. However, the statistics produced for multiprocessor systems reflect the combined time that all CPUs spent in each mode.

Examples

1. MONITOR> MONITOR MODES /PERCENT

```

                                OpenVMS Monitor Utility
                                TIME IN PROCESSOR MODES (%)
                                on node SAMPLE
                                29-APR-1995 22:52:42
+-----+
| CUR |
+-----+

                                0%      25%      50%      75%      100%
                                + - - - + - - - + - - - + - - - +
Interrupt Stack                4 | *
MP Synchronization             |
Kernel Mode                    6 | **
Executive Mode                 2 |
Supervisor Mode                |
User Mode                      72 | *****
Compatibility Mode             |
Idle Time                      16 | *****
                                + - - - + - - - + - - - + - - - +

```

This display shows that, over the last collection interval, the processor spent 72% of its time executing user code, 8% executing system code to service user requests in executive and kernel modes, and 4% processing interrupts on the interrupt

MONITOR MONITOR MODES

stack. It was idle 16% of the time. Time spent executing OpenVMS RMS code is included in executive-mode time. Time spent executing DCL code is included in supervisor-mode time.

If you omit the /PERCENT qualifier or specify /NOPERCENT, MONITOR displays mode times as rates of clock ticks per second, where a clock tick is 10 milliseconds. On a uniprocessor, the rate value is equivalent to the percent value.

2. MONITOR> MONITOR MODES

```

                                OpenVMS Monitor Utility
                                TIME IN PROCESSOR MODES
                                on node SAMPLE
                                29-APR-1995 15:02:36
+-----+
| CUR |
+-----+

Combined for 2 (of 4) CPUs      0      50      100     150     200
+-----+-----+-----+-----+-----+
Interrupt Stack                 |         |         |         |
MP Synchronization              |         |         |         |
Kernel Mode                     2 |*      |         |         |
Executive Mode                  1 |*      |         |         |
Supervisor Mode                 |         |         |         |
User Mode                       101 |*****|         |
Compatibility Mode              |         |         |         |
Idle Time                       96 |*****|         |
+-----+-----+-----+-----+-----+
```

This example demonstrates output of the MONITOR MODES command for a multiprocessor system. Displayed statistics represent rates of clock ticks per second. Information in the upper left corner of the screen indicates that node SAMPLE has four CPUs, two of which are active. Because the command line does not include the /CPU qualifier, statistics reflect the combined time that all CPUs spent in each mode.

MONITOR MSCP_SERVER

The MONITOR MSCP_SERVER command initiates monitoring of the mass storage control protocol (MSCP) Server class.

Format

MONITOR MSCP_SERVER

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The MSCP server class consists of several data items that can be useful in tuning the MSCP server. These data items are:

- **Server I/O Request Rate**—The rate at which remote processors request I/O transfers.
- **Read Request Rate**—The rate at which remote processors request Read I/O transfers.
- **Write Request Rate**—The rate at which remote processors request Write I/O transfers.
- **Extra Fragment Rate**—The rate at which the server issues extra fragments. One or more extra fragments are created when, due to buffering constraints, the MSCP server issues multiple I/Os in order to fulfill a single I/O request. For example, if the MSCP server breaks up a 64-block request into 4 fragments of 16 blocks, 3 extra fragments are created.
- **Fragmented Request Rate**—The rate at which fragmented requests occur. A fragmented request is a transfer request that the server fragments due to buffering constraints. For example, one fragmented request occurs when the server splits a 36-block request into 3 fragments of 16 blocks, 16 blocks, and 4 blocks. In this example, the server creates two extra fragments.
- **Buffer Wait Rate**—The rate at which “buffer waits” occur in the server. A buffer wait occurs when a request must wait for MSCP buffer memory.
- **Request Size Rates**—A histogram that displays the rate of requests for various block sizes.

MONITOR MONITOR MSCP_SERVER

Example

```
MONITOR> MONITOR MSCP_SERVER
```

```
OpenVMS Monitor Utility  
MSCP SERVER STATISTICS  
on node GLOBBO  
29-APR-1995 09:51:43
```

| | CUR | AVE | MIN | MAX |
|-------------------------|------|------|------|------|
| Server I/O Request Rate | 0.00 | 0.71 | 0.00 | 6.22 |
| Read Request Rate | 0.00 | 0.54 | 0.00 | 6.22 |
| Write Request Rate | 0.00 | 0.16 | 0.00 | 6.16 |
| Extra Fragment Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Fragmented Request Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Buffer Wait Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Request Size Rates 1 | 0.00 | 0.07 | 0.00 | 0.98 |
| (Blocks) 2-3 | 0.00 | 0.03 | 0.00 | 0.65 |
| 4-7 | 0.00 | 0.03 | 0.00 | 0.65 |
| 8-15 | 0.00 | 0.10 | 0.00 | 1.63 |
| 16-31 | 0.00 | 0.46 | 0.00 | 5.51 |
| 32-63 | 0.00 | 0.00 | 0.00 | 0.00 |
| 64+ | 0.00 | 0.00 | 0.00 | 0.00 |

This example demonstrates use of the MONITOR MSCP_SERVER command to generate MSCP statistics on node GLOBBO.

MONITOR PAGE

The MONITOR PAGE command initiates monitoring of the PAGE class.

Format

```
MONITOR PAGE
```

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The PAGE class includes the following data items:

- Page Fault Rate—Rate of page faults for all working sets
- Page Read Rate—Rate of pages read from disk as a result of page faults
- Page Read I/O Rate—Rate of read I/O operations from disk as a result of page faults
- Page Write Rate—Rate at which pages were written to the page file
- Page Write I/O Rate—Rate of write I/O operations to the page file
- Free List Fault Rate—Rate at which pages were read from the free-page list as a result of page faults
- Modified List Fault Rate—Rate of pages read from the modified-page list as a result of page faults
- Demand Zero Fault Rate—Rate at which zero-filled pages were allocated as a result of page faults
- Global Valid Fault Rate—Rate of page faults for pages that are not in the process's working set, but are in physical memory and are indicated as valid pages in the systemwide global page tables
- Writes In Progress Fault Rate—Rate of pages read that were in the process of being written back to disk when faulted
- System Fault Rate—Rate of page faults for pages in system space
- Free List Size—Number of pages on the free-page list
- Modified List Size—Number of pages on the modified-page list

Example

MONITOR> MONITOR PAGE

```

OpenVMS Monitor Utility
PAGE MANAGEMENT STATISTICS
  on node SAMPLE
29-APR-1995 22:22:44

```

| CUR | AVE | MIN | MAX |
|-----|-----|-----|-----|
|-----|-----|-----|-----|

MONITOR MONITOR PAGE

| | | | | |
|----------------------------|---------|---------|---------|---------|
| Page Fault Rate | 26.82 | 18.27 | 9.66 | 26.82 |
| Page Read Rate | 3.97 | 2.65 | 1.33 | 3.97 |
| Page Read I/O Rate | 1.32 | 0.99 | 0.66 | 1.32 |
| Page Write Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Page Write I/O Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Free List Fault Rate | 13.90 | 10.96 | 8.00 | 13.90 |
| Modified List Fault Rate | 5.62 | 2.99 | 0.33 | 5.62 |
| Demand Zero Fault Rate | 4.63 | 2.65 | 0.66 | 4.63 |
| Global Valid Fault Rate | 1.32 | 0.66 | 0.00 | 1.32 |
| Wrt In Progress Fault Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| System Fault Rate | 2.31 | 1.99 | 1.66 | 2.31 |
| Free List Size | 3164.00 | 3176.00 | 3164.00 | 3188.00 |
| Modified List Size | 155.00 | 131.00 | 107.00 | 155.00 |

This example shows that the current rate of pages read per read I/O operation is approximately 3 per second (Page Read Rate divided by Page Read I/O Rate). Note that while the page fault rate is currently at the highest point of the monitoring session, the majority of the pages are faulted from memory, not from disk.

MONITOR PROCESSES

The MONITOR PROCESSES command initiates monitoring of the PROCESSES class, which displays information on all processes in the system.

In a multfile summary request, the classes CLUSTER and PROCESSES are ignored. If these classes are the only classes specified on the command line, MONITOR does not recognize them and displays a "no classes specified" error message.

Format

MONITOR PROCESSES

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/TOPBIO

Specifies that a bar graph listing the top buffered I/O users be produced instead of the standard display and summary output. Values are expressed in units of buffered I/Os per second.

/TOPCPU

Specifies that a bar graph listing the top CPU time users be produced instead of the standard display and summary output. Values are expressed in units of clock ticks (10 milliseconds) per second.

/TOPDIO

Specifies that a bar graph listing the top direct I/O users be produced instead of the standard display and summary output. Values are expressed in units of direct I/Os per second.

/TOPFAULT

Specifies that a bar graph listing the top page faulting processes be produced instead of the standard display and summary output. Values are expressed in units of page faults per second.

VAX

/TOPRBS (VAX Only)

On VAX systems, specifies that a bar graph listing the top balance slot faulting processes be produced instead of the standard display and summary output. Values are expressed in units of balance slot faults per second. ♦

Description

As illustrated in the examples, the PROCESSES display (and summary) formats are different from those of all other classes. The PROCESSES display provides the following information:

- **PID**—Process identification as assigned by the system, in hexadecimal
- **STATE**—Process's scheduler state (see the description of the MONITOR STATES command for an explanation and a tabular summary of the STATES codes)
- **PRI**—Current (as opposed to base) priority of the process
- **NAME**—Process name
- **PAGES**—Number of shareable pages and total number of pages currently in use by the process
- **DIOCNT**—Cumulative direct I/O operations performed by the process since its creation; not displayed if the process is swapped out
- **FAULTS**—Cumulative page faults since the process was created; not displayed if the process is swapped out
- **CPU TIME**—Cumulative CPU time used by the process since its creation, in the format hours:minutes:seconds; not displayed if the process is swapped out

The top corners of the display contain the number of processes in the system and the time in days, hours, minutes, and seconds since the system was last booted. Processes that are swapped out are so noted.

If more processes are in the system than can be displayed on the terminal screen at once, the display consists of multiple screens. Screens are presented one at a time at intervals specified with the /VIEWING_TIME qualifier. Note that the five /TOP bar graph displays provide the PID and process name of each of the top eight users.

As with the other bar graph displays, examples in the displays of top users are rounded to the nearest whole number. Up to eight processes with nonzero values are displayed. To be eligible for inclusion in the list of top users, a process must be present and swapped in at the beginning and end of the display interval. This eligibility requirement also applies to the beginning and ending of the entire period covered by a summary.

Note that only one of the displays of top users or the regular PROCESSES display can be selected in a single MONITOR request.

Examples

```
Process Count: 20      OpenVMS Monitor Utility      Uptime: 1 23:26:10
                        PROCESSES
                        on node SAMPLE
                        29-APR-1995 12:39:09
```

| PID | STATE | PRI | NAME | PAGES | DIOCNT | FAULTS | CPU TIME |
|----------|-------|-----|---------------|--------|---------|--------|------------|
| 00000081 | HIB | 16 | SWAPPER | 0/0 | 0 | 0 | 00:00:15.8 |
| 00000102 | LEFO | 4 | SAMPLE1001 | 87/232 | SWAPPED | OUT | |
| 00000103 | COM | 4 | SAMPLE1101 | 16/100 | 7127 | 51298 | 00:05:11.0 |
| 00000084 | HIB | 8 | ERRFMT | 64/174 | 2750 | 125 | 00:00:43.9 |
| 00000086 | LEF | 8 | OPCOM | 73/272 | 283 | 178 | 00:00:07.7 |
| 00000087 | HIB | 9 | JOB_CONTROL | 57/293 | 707 | 167 | 00:00:10.5 |
| 00000088 | HIB | 8 | CONFIGURE | 43/205 | 22 | 123 | 00:00:00.6 |
| 0000008A | HIB | 6 | SYMBIONT_0001 | 5/56 | 50 | 617 | 00:03:15.1 |
| 0000008B | HIB | 8 | JNLACP | 75/580 | 15149 | 4922 | 00:21:51.1 |
| 0000008C | HIB | 8 | NETACP | 5/954 | 11 | 1057 | 00:25:06.8 |
| 0000008D | HIB | 5 | EVL | 7/56 | 44 | 34384 | 00:00:20.5 |
| 0000008E | HIB | 9 | REMACP | 5/54 | 13 | 107 | 00:00:01.3 |
| 00000112 | COM | 4 | SAMPLE1601 | 45/111 | 13131 | 39992 | 00:06:39.1 |
| 0000011E | CUR | 9 | SMITH | 89/298 | 138 | 830 | 00:00:07.1 |

This example illustrates a PROCESSES display generated from the input file PROCS.DAT. One line is displayed for each process in the system. Note that this display shows current values only—average, minimum, and maximum statistics are not available. Also note that for swapped-out processes, the words SWAPPED OUT replace the three rightmost items, because those items are not available for swapped-out processes. Because this example is a playback request, the system uptime displayed is that of the system at the time the MONITOR data was recorded.

```
MONITOR> MONITOR/INPUT=PROCS.DAT PROCESSES/TOPDIO
```

```

OpenVMS Monitor Utility
TOP DIRECT I/O RATE PROCESSES
on node SAMPLE
29-APR-1995 16:13:38

```

| | | | 0 | | 25 | | 50 | | 75 | | 100 | |
|----------|------------|----|---|-------|----|---|----|---|----|---|-----|---|
| | | | + | - | + | - | + | - | + | - | + | - |
| 000000C7 | SAMPLE0901 | 25 | | ***** | | | | | | | | |
| 00000112 | SAMPLE1601 | 17 | | ***** | | | | | | | | |
| 00000102 | SAMPLE1001 | 14 | | ***** | | | | | | | | |
| 00000103 | SAMPLE1101 | 12 | | **** | | | | | | | | |
| 00000080 | NULL | 12 | | **** | | | | | | | | |
| 0000011E | SMITH | 4 | | * | | | | | | | | |
| 0000008C | NETACP | 1 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | + | - | + | - | + | - | + | - | + | - |

PLAYBACK

This example shows that the process SAMPLE0901, with a rate of 25 per second, was the top consumer of direct I/Os during the most recent interval between displays.

MONITOR RMS

The MONITOR RMS command initiates monitoring of the OpenVMS Record Management Services (OpenVMS RMS) statistics class for a specific file.

Format

MONITOR RMS

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/FILE=(file-name[,...])

Specifies a list of one or more files to which the MONITOR RMS command applies. If you include a node name as part of the file specification, MONITOR ignores the node name. Use the /NODE command qualifier to select specific nodes for MONITOR RMS requests. If you use the /NODE command qualifier to specify multiple nodes, the file must exist on all specified nodes. You can list up to 5,000 files. Do not specify wildcard characters.

/ITEM=(keyword[,...])

Selects one or more data items for inclusion in display and summary output. If you specify two or more keywords, enclose them in parentheses, and separate them with commas. When the /ITEM qualifier is omitted, the default is /ITEM=OPERATIONS.

MONITOR MONITOR RMS

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

/ITEM Qualifier Keywords

OPERATIONS

Specifies that RMS basic operations statistics are displayed for the selected file.

DATA_RATES

Specifies that RMS data rate statistics are displayed for the selected file.

LOCKING

Specifies that RMS locking statistics are displayed for the selected file.

CACHING

Specifies that RMS caching statistics are displayed for the selected file.

Description

When you enter the MONITOR RMS command, you must use the **/FILE** qualifier to specify an input file. MONITOR displays RMS statistics for the input file that you specify. MONITOR only displays statistics for the input file if statistics is enabled for the file, and the file is open. For information about enabling statistics for a file, see the **SET FILE** command in the *OpenVMS DCL Dictionary* and the *OpenVMS Record Management Services Reference Manual*.

The MONITOR RMS command generates RMS statistics of the following types:

- Basic operations (produced by specifying the **OPERATIONS** item)
- Data rates per operation (produced by specifying the **DATA_RATES** item)
- File locking (produced by specifying the **/LOCKING** item)
- Caching (produced by specifying the **/CACHING** item)

Basic operations statistics consist of the following data items:

- Sequential \$Get Call Rate
- Keyed \$Get Call Rate
- RFA \$Get Call Rate
- Sequential \$Find Call Rate
- Keyed \$Find Call Rate
- RFA \$Find Call Rate
- Sequential \$Put Call Rate
- Keyed \$Put Call Rate
- \$Read Call Rate
- \$Write Call Rate
- \$Update Call Rate

- \$Delete Call Rate
- \$Truncate Call Rate
- \$Extend Call Rate
- \$Flush Call Rate

Data rate statistics consist of the following data items:

- Total \$GET Call Rate
- Bytes per \$GET
- Total \$PUT Call Rate
- Bytes Per \$PUT
- Total \$UPDATE Call Rate
- Bytes per \$UPDATE
- \$READ Call Rate
- Bytes per \$READ
- \$WRITE Call Rate
- Bytes per \$WRITE
- \$TRUNCATE Call Rate
- Blocks per \$TRUNCATE
- \$EXTEND Call Rate
- Blocks per \$EXTEND

File locking statistics consist of the following data items:

- New ENQ Rate
- DEQ Rate
- Converted ENQ Rate
- Blocking AST Rate
- Bucket Split Rate
- Multi-Bucket Split Rate

Caching statistics consist of the following data items:

- Local Cache Hit Percent
- Local Cache Attempt Rate
- Global Cache Hit Percent
- Global Cache Attempt Rate
- Global Buffer Read I/O Rate
- Global Buffer Write I/O Rate
- Local Buffer Read I/O Rate

MONITOR MONITOR RMS

- Local Buffer Write I/O Rate

Note

Values produced by the MONITOR RMS command do not include I/Os generated by the recovery mechanisms of RMS Journaling.

For more information about OpenVMS RMS, OpenVMS RMS services, and file applications, see the *OpenVMS Record Management Services Reference Manual*, *OpenVMS System Services Reference Manual*, and the *Guide to OpenVMS File Applications*.

Example

```
MONITOR> MONITOR RMS /ITEM=OPERATIONS /FILE=SYS$COMMON:[SYSEXE]SYSUAF.DAT
```

```
OpenVMS Monitor Utility
RMS FILE OPERATIONS
on node SAMPLE
29-APR-1995 11:03:06
(Index) _$254$DUA213:[SYS0.SYSEXE]SYSUAF.DAT;2
Active Streams: 17
```

| | | CUR | AVE | MIN | MAX |
|----------------------|-------|------|------|------|------|
| \$GET Call Rate | (Seq) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (Key) | 4.30 | 2.15 | 0.00 | 6.76 |
| | (RFA) | 0.00 | 0.00 | 0.00 | 0.00 |
| \$FIND Call Rate | (Seq) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (Key) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (RFA) | 0.00 | 0.00 | 0.00 | 0.00 |
| \$PUT Call Rate | (Seq) | 0.00 | 0.00 | 0.00 | 0.00 |
| | (Key) | 0.20 | 0.14 | 0.00 | 0.30 |
| \$READ Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |
| \$WRITE Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |
| \$UPDATE Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |
| \$DELETE Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |
| \$TRUNCATE Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |
| \$EXTEND Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |
| \$FLUSH Call Rate | | 0.00 | 0.00 | 0.00 | 0.00 |

This example demonstrates the use of the MONITOR RMS command to generate basic operations statistics for the file SYSUAF.DAT.

MONITOR SCS

The MONITOR SCS command initiates monitoring of the System Communications Services (SCS) class.

Format

```
MONITOR SCS
```

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/ITEM=(keyword[,...])

Selects one or more data items for inclusion in display and summary output. If you specify two or more keywords, enclose them in parentheses, and separate them with commas. When the /ITEM qualifier is omitted, the default is /ITEM=KB_MAP.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

/PERCENT

/NOPERCENT

Controls whether statistics are expressed as percent values in display and summary output. The /PERCENT qualifier is applicable only to the DISK, MODES, SCS, and STATES classes. By default, statistics are not expressed as percent values.

/ITEM Qualifier Keywords

ALL

Specifies that statistics on all data items collected for the disks are displayed on successive screens

BUFFER_DESCRIPTOR

Specifies that statistics on the queued-for-buffer-descriptor (on the local node) rate are displayed for each node

D_DISCARD

Specifies that datagram discard rate statistics are displayed for each node

D_RECEIVE

Specifies that datagram receive rate statistics are displayed for each node

D_SEND

Specifies that datagram send rate statistics are displayed for each node

KB_MAP

Specifies that kilobyte map rate statistics are displayed for each node

KB_REQUEST

Specifies that kilobyte request (via request datas) rate statistics are displayed for each node

KB_SEND

Specifies that kilobyte send (via send datas) rate statistics are displayed for each node

M_RECEIVE

Specifies that message receive rate statistics are displayed for each node

M_SEND

Specifies that message send rate statistics are displayed for each node

REQUEST_DATA

Specifies that request data (initiated on the local node) rate statistics are displayed for each node

SEND_CREDIT

Specifies that queued-for-send-credit (on the local node) rate statistics are displayed for each node

SEND_DATA

Specifies that send data (initiated on the local node) rate statistics are displayed for each node

Description

The SCS class is a component class. Data items for this class are collected for each node in the cluster. The SCS class consists of the following data items:

- Datagram Send Rate—Rate at which datagrams are sent to another node.
- Datagram Receive Rate—Rate at which datagrams are received from another node.
- Datagram Discard Rate—Rate at which datagrams are discarded.
- Message Send Rate—Rate at which sequenced messages are sent to another node. Sequenced messages are exchanged between nodes to communicate with mass storage control protocol (MSCP) disks and the lock manager.
- Message Receive Rate—Rate at which sequenced messages are received from another node. Sequenced messages are exchanged between nodes to communicate with MSCP disks and the lock manager.
- Send Data Rate—Rate at which block send datas are initiated on the local node.
- Kbytes Send Rate—Rate at which kilobytes are sent, as a result of send datas initiated on the local node.
- Request Data Rate—Rate at which request datas are initiated on the local node.

- **Kbytes Request Rate**—Rate at which kilobytes are received, as a result of request datas initiated on the local node.
- **Kbytes Map Rate**—Rate at which kilobytes are mapped for block transfers. This is a rough measure of the data transfer rate between the local node and a remote node. Before any transfer can take place, a buffer must be mapped. The size of the accumulated buffers that were mapped is displayed by the Kbytes Map Rate. If request datas or send datas are initiated on the local or a remote node, then the Kbytes Map Rate reflects the number of kilobytes actually transferred between the two nodes.
- **Send Credit Queued Rate**—Rate at which connections are queued for a send credit. A connection is queued for a send credit whenever all of the buffers that were allocated by the remote node have been used.
- **Buffer Descriptor Queued Rate**—Rate at which connections are queued for a buffer descriptor. A connection is queued for a buffer descriptor whenever all of the buffer descriptors have been allocated by the local node. You can increase the number of buffer descriptors allocated on the local system by adjusting the system parameter SCSBUFFCNT.

Example

MONITOR> MONITOR SCS

OpenVMS Monitor Utility
SCS STATISTICS
on node CURLEY
29-APR-1995 10:21:46

| Kbytes Map Rate | CUR | AVE | MIN | MAX |
|-----------------|------|------|------|------|
| CURLEY | 0.00 | 0.00 | 0.00 | 0.00 |
| MOE | 0.00 | 0.00 | 0.00 | 0.00 |
| LARRY | 0.00 | 0.00 | 0.00 | 0.00 |
| SHEMP | 5.64 | 3.81 | 1.98 | 5.64 |

The command in this example requests that kilobyte map rate statistics collected for SCS be displayed for each node in the cluster. The display shows block transfer map activity between the node CURLEY and the hierarchical storage controller (HSC) SHEMP. Note that each node in the cluster is identified by its SCS node name.

MONITOR STATES

The MONITOR STATES command initiates monitoring of the PROCESS STATES class, which shows the number of processes in each of the 14 scheduler states.

Format

MONITOR STATES

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

/PERCENT

/NOPERCENT

Controls whether statistics are expressed as percent values in display and summary output. The /PERCENT qualifier is applicable only to the DISK, MODES, SCS, and STATES class names. By default, statistics are not expressed as percent values.

Description

The STATES class shows the number of processes in each of the 14 scheduler states, as follows:

- Collided Page Wait (COLPG)—Waiting for a faulted page in transition.
- Mutex & Miscellaneous Resource Wait (MWAIT)—Waiting for the availability of a mutual exclusion semaphore or a dynamic resource. The following is a summary of Mutex and Miscellaneous Resource Wait states and identifying codes, as they appear in the PROCESSES class display:

| MWAIT | Reason for Wait |
|--------------|--|
| MUTEX | Mutual exclusion semaphore |
| RWAST | AST wait (wait for system or special kernel AST) |
| RWBRK | Breakthrough (wait for broadcast message) |
| RWCAP | CPU capability required |
| RWCLU | Cluster state transition wait |
| RWCSV | Cluster server |

| MWAIT | Reason for Wait |
|--------------|-------------------------------------|
| RWIMG | Image activation lock |
| RWLCK | Lock database |
| RWMBX | Mailbox full |
| RWMPB | Modified page writer busy |
| RWMPE | Modified page list empty |
| RWNPG | Nonpaged dynamic memory |
| RWPAG | Paged dynamic memory |
| RWPGF | Page file full |
| RWQUO | Job quota |
| RWSCS | System Communications Services wait |
| RWSNP | System snapshot |
| RWSWP | Swap file space |

- Common Event Flag Wait (CEF)—Waiting for some combination of event flags to be set in a common event block.
- Page Fault Wait (PFW)—Waiting for a page to be read as a result of a page fault; resident processes.
- Local Event Flag Wait (LEF)—Waiting for one or more local event flags to be posted; resident processes.
- Local Event Flag (Outswapped) (LEFO)—Waiting for one or more local event flags to be posted; outswapped processes.
- Hibernate (HIB)—Hibernating, or process has executed a hibernate request; resident processes.
- Hibernate (Outswapped) (HIBO)—Hibernating, or process has executed a hibernate request; outswapped processes.
- Suspended (SUSP)—Process has executed a suspend request; resident processes.
- Suspended (Outswapped) (SUSPO)—Process has executed a suspend request; outswapped processes.
- Free Page Wait (FPW)—Waiting for a free page of memory.
- Compute (COM)—Ready to use the processor; resident processes.
- Compute (Outswapped) (COMO)—Ready to use the processor; outswapped processes.
- Current Process (CUR)—Using the processor.

The data items can also be displayed as percentages of all processes.

Note that the Current Process is always the process running MONITOR, because MONITOR is running when each measurement is made.

For performance reasons, MONITOR does not synchronize the scanning of process state data structures with operating system use of those structures. It is therefore possible that MONITOR will display certain anomalous state indications.

MONITOR

MONITOR STATES

Example

```
$ MONITOR/INPUT/SUMMARY/NODISPLAY -  
_$/BEGINNING=29-APR-1995:13:00 -  
_$/ENDING=29-APR-1995:14:00 STATES/PERCENT/ALL  
$ TYPE MONITOR.SUM
```

```
OpenVMS Monitor Utility  
PROCESS STATES (%)  
on node SAMPLE  
SUMMARY  
From: 29-APR-1995 13:00:00  
To: 29-APR-1995 14:00:00
```

| | CUR% | AVE% | MIN% | MAX% |
|----------------------------|------|------|------|------|
| Collided Page Wait | 0.0 | 0.0 | 0.0 | 0.0 |
| Mutex & Misc Resource Wait | 0.0 | 0.0 | 0.0 | 0.0 |
| Common Event Flag Wait | 0.0 | 0.0 | 0.0 | 0.0 |
| Page Fault Wait | 4.3 | 1.4 | 0.0 | 4.3 |
| Local Event Flag Wait | 34.7 | 31.7 | 34.7 | 42.8 |
| Local Evt Flg (Outswapped) | 0.0 | 9.0 | 0.0 | 19.4 |
| Hibernate | 43.4 | 40.7 | 43.4 | 52.1 |
| Hibernate (Outswapped) | 0.0 | 4.3 | 0.0 | 15.4 |
| Suspended | 0.0 | 0.0 | 0.0 | 0.0 |
| Suspended (Outswapped) | 0.0 | 0.0 | 0.0 | 0.0 |
| Free Page Wait | 0.0 | 0.0 | 0.0 | 0.0 |
| Compute | 13.0 | 7.3 | 4.3 | 13.0 |
| Compute (Outswapped) | 0.0 | 0.8 | 0.0 | 3.2 |
| Current Process | 1.0 | 1.0 | 1.0 | 1.0 |
| PLAYBACK | | | | |

SUMMARIZING

The commands in this example generate and display a PROCESS STATES summary. Note that since use of the Return key is not permitted within a single MONITOR command following the MONITOR> prompt, the MONITOR command is entered at DCL level. The summary shows that, on the average, 14.1% of processes were swapped out for the summarized period. Note that the summary was requested for data covering only the hour between 1 P.M. and 2 P.M., although the input file could have contained data covering a longer period.

MONITOR SYSTEM

The MONITOR SYSTEM command initiates monitoring of the SYSTEM statistics class, which shows several of the most important items from other classes.

Format

MONITOR SYSTEM

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for

all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

Because the SYSTEM class collects the most significant performance statistics from other classes in a single display, it is particularly useful to system managers and other users seeking a general overview of system activity. The SYSTEM class includes the following data items:

- Interrupt Stack (on VAX systems) or Interrupt State (on Alpha systems)
- MP Synchronization
- Kernel Mode
- Executive Mode
- Supervisor Mode
- User Mode
- Compatibility Mode (meaningful on VAX systems only)
- Idle Time
- Process Count
- Page Fault Rate
- Page Read I/O Rate
- Free List Size
- Modified List Size
- Direct I/O Rate
- Buffered I/O Rate

The following two display formats are provided, depending on the class-name qualifier specified:

- A tabular style format for the /ALL qualifier
- A bar graph style format for the /AVERAGE, /CURRENT, /MAXIMUM, and /MINIMUM qualifiers

MONITOR MONITOR SYSTEM

Note that the bar graph version of the SYSTEM class (shown in Example 2) contains the following data, which differs from the tabular version:

- All of the CPU processor modes except Idle Time are summarized in the CPU Busy segment.
- In the Page Fault segment, the page read I/O rate is indicated by a vertical bar. The bar provides a visual estimate of the proportion of the total page fault rate that caused read I/O operations (the hard fault rate). The hard fault rate appears to the left of the bar.
- Four segments show the processes that are currently the top consumers of CPU (since the last screen update), page faults, direct I/Os, and buffered I/Os.

Any process that MONITOR designates as a top user process must be swapped in at the beginning and ending of the display interval or at the beginning and ending of the entire period covered by a summary.

When the lower bar graph (top user) and the corresponding upper bar graph (overall system measure) are tracking the same statistic for the same interval (as in Example 2), it is reasonable to compare the two graphs. This will be the case in the following situation:

- SYSTEM is the only class being monitored (no other class names have been specified with the MONITOR command).
- The CURRENT statistic is specified.
- The /INTERVAL and /VIEWING_TIME values are equal.

Otherwise, you should exercise care in making such comparisons because the top user statistic is always CURRENT, while the overall system measure statistic may be CURRENT, AVERAGE, MAXIMUM, or MINIMUM.

Rates for top users are calculated based on the interval between two successive screen displays, while overall system rates are based on the collection interval. These two interval values can be different whenever one or more classes are being monitored with the SYSTEM class, or when /INTERVAL and /VIEWING_TIME values differ.

While other upper boundary figures for the SYSTEM class bar graphs are constants, the figures for Free List Size and Modified List Size are derived from the physical memory configuration and system parameters of individual systems. The upper boundary figure for the Free List is the number of pages available after deducting the pages permanently allocated to the operating system. This figure, sometimes referred to as **balance set memory**, is the number of pages that can be allocated to processes, the Free List, and the Modified List. The upper boundary figure for the Modified List is the value of the MPW_HILIMIT system parameter. Note that both upper boundary figures are calculated when the MONITOR request is initiated and do not change thereafter.

Examples

1. MONITOR> MONITOR SYSTEM/ALL

```
OpenVMS Monitor Utility
SYSTEM STATISTICS
on node SAMPLE
29-APR-1995 12:43:28
```

| CUR | AVE | MIN | MAX |
|-----|-----|-----|-----|
|-----|-----|-----|-----|

MONITOR MONITOR SYSTEM

| | | | | |
|--------------------|---------|---------|---------|---------|
| Interrupt Stack | 0.33 | 0.33 | 0.33 | 0.33 |
| MP Synchronization | 0.00 | 0.00 | 0.00 | 0.00 |
| Kernel Mode | 0.16 | 0.16 | 0.16 | 0.16 |
| Executive Mode | 0.00 | 0.00 | 0.00 | 0.00 |
| Supervisor Mode | 0.00 | 0.00 | 0.00 | 0.00 |
| User Mode | 0.50 | 0.49 | 0.50 | 0.50 |
| Compatibility Mode | 0.00 | 0.00 | 0.00 | 0.00 |
| Idle Time | 99.00 | 98.67 | 99.00 | 99.00 |
| Process Count | 14.00 | 14.00 | 14.00 | 14.00 |
| Page Fault Rate | 0.33 | 0.33 | 0.33 | 0.33 |
| Page Read I/O Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Free List Size | 4255.00 | 4255.00 | 4255.00 | 4255.00 |
| Modified List Size | 105.00 | 105.00 | 105.00 | 105.00 |
| Direct I/O Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Buffered I/O Rate | 0.16 | 0.16 | 0.16 | 0.16 |

This example shows the tabular style format for the SYSTEM display.

2. MONITOR> MONITOR SYSTEM

```

Node: SAMPLE                      OpenVMS Monitor Utility    29-APR-1995 12:38:48
Statistic: CURRENT                SYSTEM STATISTICS

                                Process States
+ CPU Busy (100)                -+      LEF: 7      LEFO: 0
|*****|                        |      HIB: 11     HIBO: 0
CPU 0 +-----+ 100            |      COM: 4      COMO: 0
|*****|                        |      PFW: 0      Other: 1
+-----+                        |      MWAIT: 0
Cur Top: ASSEM_LIBRTL (34)      Total: 23

+ Page Fault Rate (25)          -+      + Free List Size (4604) -+
|**|***|                        |      |*****| 12K
MEMORY 0 +-----+ 100        0 +-----+
|**|                        |      |*****| 500
+-----+                    +      + Modified List Size (146) +
Cur Top: ASSEM_SYS (11)

+ Direct I/O Rate (15)          -+      + Buffered I/O Rate (0) -+
|*****|                        |      |      |
I/O 0 +-----+ 60           0 +-----+ 150
|****|                        |      |
+-----+                    +      +-----+
Cur Top: ASSEM_SYS (10)      Cur Top: Cerb Servant (0)

```

This example shows the bar graph style format for the SYSTEM display.

MONITOR TRANSACTION

The MONITOR TRANSACTION command initiates monitoring of the TRANSACTION class, which shows information about transactions coordinated by DECdtm services.

Format

MONITOR TRANSACTION

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

MONITOR

MONITOR TRANSACTION

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

/MAXIMUM

Selects maximum statistics to be displayed in a bar graph for display and summary output.

/MINIMUM

Selects minimum statistics to be displayed in a bar graph for display and summary output.

Description

The TRANSACTION class consists of the following data items:

- **Start Rate**—The rate at which new transactions are started on the local node.
- **Prepare Rate**—The rate at which transactions on the local node are placed in the Prepared state by DECdtm services.
- **One-Phase Commit Rate**—The rate at which transactions on the local node complete using the one-phase commit operation. This operation, which consumes significantly fewer system resources, is used when there is only a single resource manager participating in the transaction.
- **Total Commit Rate**—The rate at which transactions on the local node are committed. This value is the combined total of one-phase and two-phase commit transactions.
- **Abort Rate**—The rate at which transactions on the local node are aborted.
- **End Rate**—The rate at which transactions that were started on the local node are committed.
- **Remote Start Rate**—The rate at which transaction branches are started on the local node.
- **Remote Add Rate**—The rate at which transaction branches are added on the local node.
- **Completion Rate**—The rate at which transactions complete, indexed by their duration in seconds. The following is a list of the Completion Rate categories:

MONITOR MONITOR TRANSACTION

| | |
|---------------------|--|
| Completion Rate 0-1 | The number of transactions completed in 0-1 seconds (1 second or less) |
| Completion Rate 1-2 | The number of transactions completed in 1-2 seconds |
| Completion Rate 2-3 | The number of transactions completed in 2-3 seconds |
| Completion Rate 3-4 | The number of transactions completed in 3-4 seconds |
| Completion Rate 4-5 | The number of transactions completed in 4-5 seconds |
| Completion Rate 5+ | The number of transactions that took more than 5 seconds to complete |

For example, a transaction that completes in 0.5 second is included in the statistics displayed for the Completion Rate 0-1 category.

Examples

1. MONITOR> MONITOR TRANSACTION/ALL

```

OpenVMS Monitor Utility
DISTRIBUTED TRANSACTION STATISTICS
on node SAMPLE
16-JAN-1994 14:52:34

CUR      AVE      MIN      MAX
Start Rate      34.76    34.76    34.76    34.76
Prepare Rate    33.77    33.77    33.77    33.77
One Phase Commit Rate 0.00    0.00    0.00    0.00
Total Commit Rate 35.09    35.09    35.09    35.09
Abort Rate      0.00    0.00    0.00    0.00
End Rate        35.09    35.09    35.09    35.09
Remote Start Rate 31.12    31.12    31.12    31.12
Remote Add Rate  31.45    31.45    31.45    31.45

Completion Rate 0-1      35.09    35.09    35.09    35.09
by Duration 1-2      0.00    0.00    0.00    0.00
in Seconds 2-3      0.00    0.00    0.00    0.00
3-4      0.00    0.00    0.00    0.00
4-5      0.00    0.00    0.00    0.00
5+      0.00    0.00    0.00    0.00

```

This example shows the status of all transactions on node SAMPLE.

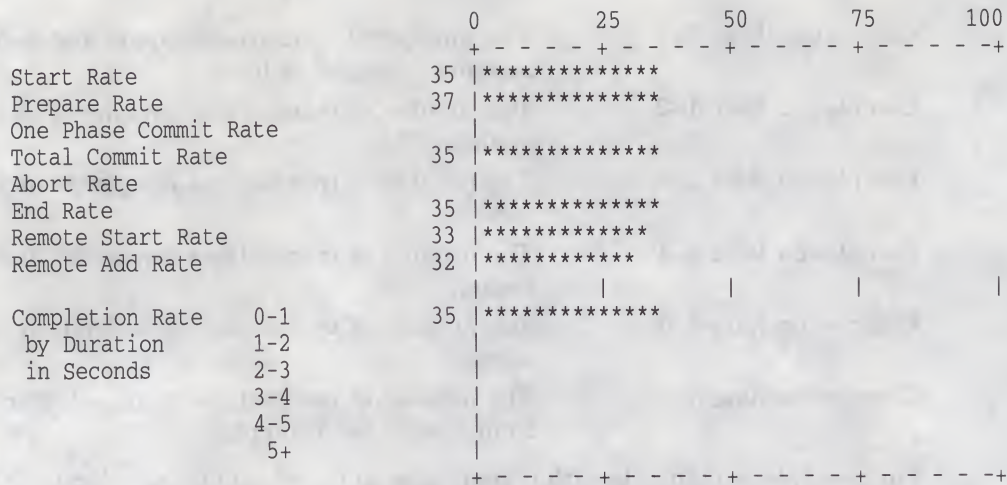
2. MONITOR> MONITOR TRANSACTION/MAXIMUM

```

OpenVMS Monitor Utility
+-----+ DISTRIBUTED TRANSACTION STATISTICS
| MAX | on node SAMPLE
+-----+ 16-JAN-1994 14:51:04

```


MONITOR MONITOR TRANSACTION



This example shows the maximum statistics of all transactions on node SAMPLE.

MONITOR VECTOR

The MONITOR VECTOR command displays the number of 10-millisecond clock ticks per second in which one or more vector consumers have been scheduled on each currently configured vector processor in the system.

Format

MONITOR VECTOR

Command Qualifiers

/qualifier[,...]

One or more qualifiers as described in the Command Qualifier Descriptions section.

Class-Name Qualifiers

/ALL

Specifies that a table of all available statistics (current, average, minimum, and maximum) is to be included in the display and summary output. For summary output, this qualifier is the default for all classes; otherwise, it is the default for all classes except CLUSTER, MODES, PROCESSES, STATES, SYSTEM, and VECTOR.

/AVERAGE

Selects average statistics to be displayed in a bar graph for display and summary output.

/CURRENT

Selects current statistics to be displayed in a bar graph for display and summary output. The /CURRENT qualifier is the default for the CLUSTER, MODES, STATES, SYSTEM, and VECTOR classes.

MONITOR SET DEFAULT

SET DEFAULT

The SET DEFAULT command sets command qualifier, class-name parameter, and class-name qualifier defaults for the MONITOR command. Each SET DEFAULT command sets only the command qualifiers you specify, but replaces the entire set of class-name parameters and class-name qualifiers. All qualifiers and class names are identical to those for the MONITOR command.

Format

```
SET DEFAULT [/qualifier[,...]] classname[,...] [/qualifier[,...]]
```

Parameters

classname[,...]

Specifies one or more class names.

Command Qualifiers

/qualifier[,...]

One or more command qualifiers as described in the Commands Qualifier Description section.

Class-Name Qualifiers

/qualifier[,...]

One or more class-name qualifiers.

Description

Command and class-name qualifiers are identical to those for the MONITOR class-name commands.

Example

```
MONITOR> SET DEFAULT /INTERVAL=10 PAGE/AVERAGE+IO/MAXIMUM /NODE=(LARRY,MOE,CURLEY)
```

The command in this example selects PAGE and IO as the default classes for the MONITOR command and specifies an interval of 10 seconds for the statistics display. The command specifies that AVERAGE statistics be displayed for the PAGE class, and that MAXIMUM statistics be displayed for the IO class. Finally, the command requests that data be collected on nodes LARRY, MOE, and CURLEY. After establishing these defaults, you can enter the MONITOR command without any qualifiers or parameters to display the requested information.

SHOW DEFAULT

The **SHOW DEFAULT** command displays the defaults established by the **SET DEFAULT** command.

Format

SHOW DEFAULT

Parameters

None.

Qualifiers

None.

Description

The **SHOW DEFAULT** command verifies the defaults you have set with the **SET DEFAULT** command.

Example

```
MONITOR> SHOW DEFAULT
/BEGINNING = current time           /INTERVAL      = 10
/ENDING    = indefinite              /VIEWING_TIME  = 10
/FLUSH_INTERVAL = 300
/NOINPUT
/NORECORD
/DISPLAY   = SYS$OUTPUT:.;
/NOSUMMARY
/NOFILENAME
/NOCOMMENT
Classes:
  PAGE/AVERAGE          IO/MAXIMUM
Nodes:
  LARRY                  MOE                CURLEY
```

The command in this example displays the defaults specified by the previous **SET DEFAULT** command.

2

MONDAY 11/21/1911

MOUNT Description

The Mount utility (MOUNT) is used to make a disk or magnetic tape available for processing. MOUNT allows you to ensure that the device has not been allocated to another user, that a volume is physically loaded on the device specified, and that the label on the volume matches the label specified. For magnetic tape volumes, MOUNT also checks the volume accessibility field of the VOL1 label.

Normally, MOUNT allocates the device to the user who enters the command. However, mounting volumes with the /SHARE, /GROUP, or /SYSTEM qualifier deallocates the device, because the purpose of these qualifiers is to make the volume shareable.

Note

To mount a volume on a device, you must have read (R), write (W), or control (C) access to that device.

Any subprocess in the process tree can mount or dismount a volume for the job. When a subprocess mounts a volume (for the job) as private, the master process of the job becomes the owner of this device. This provision is necessary because the subprocess may be deleted and the volume should remain privately mounted for this job. However, when a subprocess explicitly allocates a device and then mounts a private volume on this device, the subprocess retains device ownership. In this situation, only subprocesses with SHARE privilege have access to the device.

Upon successful completion of the operation, MOUNT notifies you with a message sent to SYS\$OUTPUT. If the operation fails for any reason, MOUNT notifies you with an error message.

MOUNT Usage Summary

The Mount utility (MOUNT) allows you to make a disk or magnetic tape volume available for processing.

Format

MOUNT device-name[:][,...] [volume-label[,...]] [logical-name[:]]

Parameters

device-name[:][,...]

Specifies the physical device name or logical name of the device on which the volume is to be mounted. On a system where volumes are not connected to hierarchical storage controllers, use the following format:

ddcu:

The **dd** describes the device type of the physical devices used. For example, an RA60 disk drive is device type DJ, and an RA80 or RA81 disk drive is device type DU. The **c** identifies the controller, and the **u** identifies the unit number of the device.

On a system with HSCs, use one of the following formats:

node\$ddcu:

allocation-class\$ddcu:

If your devices are dual ported to HSCs, use the allocation-class format. For example, \$125\$DUA23 represents an RA80 or RA81 disk with unit number 23. The disk's allocation class is \$125\$. The **c** part of the format is always A for HSC disks. TROLL\$DJA12 represents an RA60 disk with unit number 12. The device is connected to an HSC named TROLL. See *VMScluster Systems for OpenVMS* for more information about naming conventions.

Device names can be generic so that if no controller or unit number is specified, the system attempts to mount the first available device that satisfies those specified components of the device names. If no volume is physically mounted on the specified device, MOUNT displays a message requesting that you place the volume in the device; after you place the volume in the named drive, MOUNT then completes the operation.

If you specify more than one device name for a disk or magnetic tape volume set, separate the device names with either commas or plus signs. For a magnetic tape volume set, you can specify more volume labels than device names or more device names than volumes.

volume-label[,...]

Specifies the label on the volume. The number of characters allowed in a label depends on the type of device, as follows:

| Device Type | Number of Characters in Label |
|---------------|----------------------------------|
| Magnetic tape | 0-6 |
| Files-11 disk | 1-12 |
| ISO 9660 disk | 1-32 |

OpenVMS requires disk volume labels to be unique in the first 12 characters within a given domain. For example, disks mounted by different members of the same group using the /GROUP qualifier must be unique. However, disks mounted in different domains, such as one mounted using the /GROUP qualifier and one mounted privately, can use the same volume label.

If you mount an ISO 9660 volume using the /SYSTEM or /CLUSTER qualifier, and the volume label is not unique within the first 12 characters, you must supply an alternate volume label using the qualifier /OVERRIDE=IDENTIFICATION. If you choose this option, then Mount verification is disabled for the device.

In addition, if a volume is part of a volume set and the first 12 characters of the volume-set name are the same as the first 12 characters of the volume label, a lock manager deadlock will occur. To avoid this problem, you must override either the volume label (by using the /OVERRIDE qualifier) or the volume-set name (by using the /BIND qualifier).

If you specify more than one volume label, separate the labels with either commas or plus signs. The volumes must be in the same volume set and the labels must be specified in ascending order according to relative volume number.

When you mount a magnetic tape volume set, the number of volume labels need not equal the number of device names specified. When a magnetic tape reaches the end-of-tape (EOT) mark, the system requests the operator to mount the next volume on one of the devices. The user is not informed of this request; only the operator is informed.

When you mount a disk volume set, each volume label specified in the list must correspond to a device name in the same position in the device name list.

The volume-label parameter is not required when you mount a volume with the /FOREIGN or /NOLABEL qualifier or when you specify /OVERRIDE=IDENTIFICATION. To specify a logical name when you enter either of these qualifiers, type any alphanumeric characters in the volume-label parameter position.

logical-name[:]

Defines a 1- to 255-alphanumeric character string logical name to be associated with the volume.

If you do not specify a logical name, the MOUNT command assigns the default logical name DISK\$volume-label to individual disk drives; it assigns the default logical name DISK\$volume-set-name to the device on which the root volume of a disk volume set is mounted. Note that if you specify a logical name in the mount request that is different from DISK\$volume-label or DISK\$volume-set-name, then two logical names are associated with the device.

If you do not specify a logical name for a magnetic tape drive, the MOUNT command assigns only one logical name, TAPE\$volume-label, to the first magnetic tape device in the list. No default logical volume-set name is assigned in this case.

MOUNT Usage Summary

The MOUNT command places the name in the process logical name table, unless you specify /GROUP or /SYSTEM. In the latter cases, it places the logical names in the group or system logical name table.

If you specify the /CLUSTER qualifier, the logical name is established on each node in the cluster.

Note

Avoid assigning a logical name that matches the file name of an executable image in SYS\$SYSTEM. Such an assignment prohibits you from invoking that image.

Do not use the logical name assigned to a volume as a distributed file system (DFS) access point. If you attempt to add a DFS access point using the same name as the logical name, DFS fails as in the following example:

```
$ SHOW LOG DISK$*
(LNM$SYSTEM_TABLE)
  "DISK$TIVOLI_SYS" = "TIVOLI$DUA0:"
$ MCR DFS$CONTROL
DFS> ADD ACCESS DISK$TIVOLI_SYS TIVOLI$DUA0:[000000]
%DNS-W-NONNAME, Unknown namespace name specified
```

If the logical name of a volume is in a process-private table, then the name is not deleted when the volume is dismounted.

Usage Summary

To invoke MOUNT, enter the DCL command MOUNT, followed by the device name, volume label, and logical name. You must include a device name and a volume label (unless you specify /OVERRIDE=IDENTIFICATION or use the /FOREIGN or /NOLABEL qualifier); the logical name is optional.

MOUNT returns you to the DCL level after it either successfully completes the operation or fails, generating an error message. If you press Ctrl/Y or Ctrl/C, MOUNT aborts the operation and returns you to the DCL prompt.

You can direct output from MOUNT operations with the /COMMENT and /MESSAGE qualifiers. When the mount operation requires operator assistance, use /COMMENT to specify additional information to be included with the operator request. The /COMMENT text string is sent to the operator log file and to SYS\$OUTPUT. The string must contain no more than 78 characters.

Use the /MESSAGE qualifier (this is the default) to send mount request messages to your current SYS\$OUTPUT device. If you specify /NOMESSAGE during an operator-assisted mount, messages are not sent to SYS\$OUTPUT; the operator sees them, however, if an operator terminal is enabled to receive messages.

Many MOUNT qualifiers require special privileges. Some qualifiers require different privileges according to which qualifier keyword you specify. See the individual qualifiers for details. Table 2-1 lists MOUNT qualifiers that require special privileges.

Table 2-1 MOUNT Qualifiers That Require Special Privileges

| Qualifier | Keywords | Required Privilege |
|---------------|-----------------|---------------------|
| /ACCESSED | | OPER |
| /CACHE= | [NO]EXTENT[=n] | OPER |
| | [NO]FILE_ID[=n] | OPER |
| | [NO]QUOTA[=n] | OPER |
| /FOREIGN | | VOLPRO ¹ |
| /GROUP | | GRPNAM |
| /MULTI_VOLUME | | VOLPRO |
| /OVERRIDE= | ACCESSIBILITY | VOLPRO ¹ |
| | EXPIRATION | VOLPRO ¹ |
| | LOCK | VOLPRO ¹ |
| | SHADOW | VOLPRO ¹ |
| /OWNER_UIC= | uic | VOLPRO ¹ |
| /PROCESSOR= | UNIQUE | OPER |
| | SAME:device | OPER |
| | file-spec | OPER and CMKRNL |
| /PROTECTION= | code | VOLPRO ¹ |
| /QUOTA | | VOLPRO ¹ |
| /SYSTEM | | SYSNAM |
| /WINDOWS= | n | OPER |

¹Or your UIC must match the volume UIC.

MOUNT Qualifiers

This section describes and provides examples for the Mount utility qualifiers. The Mount utility does not have subcommands.

/ACCESSED

Specifies, for ODS1 disk volumes, the approximate number of directories that will be in use concurrently on the volume.

Format

/ACCESSED=*n*

Parameter

n

Specifies the approximate number of directories that will be in use concurrently on an ODS1 volume. (The /ACCESSED qualifier is meaningless for ODS2 volumes.) Specify a value from 0 to 255 to override the default that was specified when the volume was initialized.

You need the user privilege OPER to use /ACCESSED.

Example

```
$ MOUNT/ACCESSED=150 DBA1 WORK
```

This command requests the volume labeled WORK to be mounted on DBA1, specifying 150 as the number of active directories on the volume.

/ASSIST

Directs the mount operation to allow operator or user intervention if the mount request fails.

Format

/ASSIST

/NOASSIST

Description

When you specify the /ASSIST qualifier, MOUNT notifies the user and certain classes of operator if a failure occurs during the mount operation. If a failure occurs, the operator or user can either abort the operation or correct the error condition to allow the operation to continue.

The operator-assist messages are sent to all operator terminals that are enabled to receive messages; magnetic tape mount requests go to TAPE and DEVICE operators, and disk mount requests go to DISK and DEVICE operators. Thus, if you need operator assistance while mounting a disk device, a message is sent to DISK operators. See the description of the REPLY command in the *OpenVMS*

DCL Dictionary for more information about enabling and disabling operator terminals.

Any operator reply to a mount request is written to SYS\$OUTPUT to be displayed on the user's terminal or written in a batch job log.

If no operator terminal is enabled to receive and respond to a mount assist request, a message is displayed informing the user of the situation. If a volume is placed in the requested drive, no additional operator response is necessary. If the mount request originates from a batch job and no operator terminal is enabled to receive messages, the mount is aborted. See the *OpenVMS System Messages and Recovery Procedures Reference Manual* for a description of the error messages and their suggested user actions.

The default is /ASSIST and can be overridden by /NOASSIST.

Example

```
$ MOUNT/NOASSIST DMA0: DOC WORK
%MOUNT-I-MOUNTED, DOC          mounted on _NODE$DMA0:
```

This command mounts an RK07 volume labeled DOC and assigns the logical name WORK. The /NOASSIST qualifier signals MOUNT that no operator intervention is necessary.

/AUTOMATIC

Determines whether MOUNT enables or disables automatic volume switching and labeling for magnetic tape or ISO 9660 CD-ROM.

Format

/AUTOMATIC

/NOAUTOMATIC

Description

The default is /AUTOMATIC.

Magnetic Tape

If you have multiple magnetic tape drives allocated to a volume set, the magnetic tape ancillary control process (MTACP) performs the volume switch by sequentially selecting the next available drive allocated to the volume set. The MTACP expects the next reel of the volume set to be loaded on that drive.

If the MTACP is writing to the volume set, it creates a label and initializes the magnetic tape with that label and the protections established for the first magnetic tape of the volume set. If it is reading from the volume set, the MTACP generates the label and attempts to mount the next magnetic tape with that label. If the drive has the wrong magnetic tape (or no magnetic tape) loaded, the MTACP sends a message to the operator's console to prompt for the correct magnetic tape.

MOUNT /AUTOMATIC

The label generated by the MTACP fills the 6-character volume identifier field. The first four characters of the field contain the first four characters of the label specified in the MOUNT command, padded with underscores when the label is not at least four characters. The fifth and sixth characters contain the relative volume number for this reel in the volume set.

If you specify /NOAUTOMATIC, the MTACP requires operator intervention to switch to the next drive during end-of-tape processing, and requires that the operator specify a label for each new reel added to a volume set.

ISO 9660 CD-ROM

Under ISO 9660, not all volume-set members must be mounted to perform I/O operations against that volume set. By default, if I/O operations attempt to access an unmounted volume-set member, an operator message is sent to all DISK CLASS operators for system-mounted volume sets, or the owning process for privately mounted volume sets. The message specifies the volume-set member to mount to complete the I/O operation requested. If /NOAUTOMATIC is specified, then an I/O operation to a nonmounted volume set member completes with an error message SS\$_DEVNOTMOUNT.

Example

```
$ MOUNT/NOAUTOMATIC MTA0: ABCD,EFGH
```

This command instructs MOUNT not to generate its own label for the second volume, but to use the ones supplied with the MOUNT command. If the second volume is not already labeled, then the operator must use REPLY/INIT and supply the second label.

/BIND

Creates a volume set of one or more disk volumes or adds one or more volumes to an existing volume set.

Format

/BIND=volume-set-name

Parameter

volume-set-name

Specifies a 1- to 12-alphanumeric-character name identifying the volume set.

An ISO 9660 volume-set name can be from 1 to 128 characters in length.

OpenVMS requires volume-set names to be unique in the first 12 characters. In addition, if the first 12 characters of volume-set name are the same as the first 12 characters of any volume label, a lock manager deadlock will occur. To avoid this problem, you must override either the volume label (by using the /OVERRIDE qualifier) or the volume-set name (by using the /BIND qualifier).

Description

You must specify the /BIND qualifier when you first create the volume set or each time you add a volume to the set. To dismount an individual volume of the volume set, you must use the DISMOUNT qualifier /UNIT. Otherwise, dismounting an individual volume dismounts the entire volume set.

When you create a volume set, the volumes specified in the volume-label list are assigned relative volume numbers based on their positions in the label list. The first volume specified becomes the root volume of the set.

When you add a volume or volumes to a volume set, the first volume label specified must be that of the root volume, or the root volume must already be on line.

Note that if you attempt to create a volume set from two or more volumes that already contain files and data, the file system does not issue an error message when you issue the MOUNT/BIND command. However, the volumes are unusable as a volume set because the directory structures are not properly bound.

If you mount an ISO 9660 volume using the /SYSTEM or /CLUSTER qualifier, and the volume label is not unique within the first 12 characters, you must supply an alternate 12-character volume label using the qualifier /BIND=volume-set-name. If you choose this option, then Mount verification is disabled for the device.

Note

Once a volume is bound into a volume set, it cannot easily be unbound. To unbind a bound volume set (BVS):

1. Do an image backup of the BVS.
 2. Initialize all volumes of the BVS.
 3. Do an image restore to a single volume with the /NOINITIALIZE qualifier, or do a nonimage restore to a single volume.
-

Example

```
$ MOUNT/BIND=LIBRARY DMA0:;DMA1:;DMA2: BOOK1,BOOK2,BOOK3
```

This command creates a volume set named LIBRARY. This volume set consists of the volumes labeled BOOK1, BOOK2, and BOOK3, which are mounted physically on devices DMA0, DMA1, and DMA2, respectively.

/BLOCKSIZE

Specifies the default block size for magnetic tape volumes.

Format

/BLOCKSIZE=n

MOUNT /BLOCKSIZE

Parameter

n

Specifies the default block size value for magnetic tape volumes. Valid values are in the range 20 to 65,532 for OpenVMS RMS operations, and 18 to 65,534 for non OpenVMS RMS operations. By default, records are written to magnetic tape volumes in 2048-byte blocks. For foreign or unlabeled magnetic tapes, the default is 512 bytes.

Description

You must specify /BLOCKSIZE in two situations:

- When mounting magnetic tapes that do not have HDR2 labels. For these magnetic tapes, you must specify the block size. For example, you must specify /BLOCKSIZE=512 to mount an RT-11 magnetic tape.
- When mounting magnetic tapes that contain blocks whose sizes exceed the default block size (2048 bytes). In this case, specify the size of the largest block for the block size.

Example

```
$ MOUNT/FOREIGN/BLOCKSIZE=1000 MTA1:
```

In this example, the /BLOCKSIZE qualifier specifies a block size of 1000 bytes; the default for a magnetic tape mounted with the /FOREIGN qualifier is 512.

/CACHE

For disks, controls whether caching limits established at system generation time are disabled or overridden. With the TAPE_DATA option, enables write caching for the tape controller specified (if the tape controller supports write caching).

Format

/CACHE=(keyword[,...])

/NOCACHE

Keywords

**EXTENT[=n]
NOEXTENT**

Enables or disables extent caching. To enable extent caching, you must have the operator user privilege (OPER) and you must specify *n*, the number of entries in the extent cache. Note that NOEXTENT is equivalent to EXTENT=0; both disable extent caching.

**FILE_ID[=n]
NOFILE_ID**

Enables or disables file identification caching. To enable file identification caching, you must have the operator user privilege (OPER) and you must specify *n*, the number of entries, as a value greater than 1. Note that NOFILE_ID is equivalent to FILE_ID=1; both disable file identification caching.

LIMIT=n

Specifies the maximum amount of free space in the extent cache in one-thousandths of the currently available free space on the disk.

**QUOTA[=n]
NOQUOTA**

Enables or disables quota caching. To enable quota caching, you must have the operator user privilege (OPER) and you must specify *n*, the number of entries in the quota cache. Normally *n* is set to the maximum number of active users expected for a disk with quotas enabled. Both NOQUOTA and QUOTA=0 disable quota file caching.

TAPE_DATA

Enables write caching for a magnetic tape device if the tape controller supports write caching. The /CACHE qualifier is the default for mounting tape devices. You must specify TAPE_DATA to enable write caching. If the tape controller does not support write caching, the keyword is ignored.

The write buffer stays enabled even after you dismount the magnetic tape. To disable the write buffer, mount a tape with the /NOCACHE qualifier.

If a tape supports compaction, then the default is compaction, and caching is enabled. For tape storage devices that support compaction, the following command is valid.

```
$ MOUNT TAPE_DATA/FOREIGN/MEDIA=NOCOMPACTION/NOCACHE
```

WRITETHROUGH

Disables writeback caching, which writes only the file headers of files open for write when the files are closed. Thus, if you specify the WRITETHROUGH keyword, file headers are written to the disk on every file header operation.

Description

Used with the disk options, the /CACHE qualifier overrides one or more of the present disk caching limits established at system generation time. Used with the TAPE_DATA option, the /CACHE qualifier enables write caching for the tape controller specified.

If you do not specify the /CACHE qualifier and it is not implied by the use of the qualifier /MEDIA_FORMAT=COMPACTION, caching is enabled by default.

If you specify more than one option, separate them by commas and enclose the list in parentheses. The options [NO]EXTENT, [NO]FILE_ID, LIMIT, and [NO]QUOTA apply only to a disk device. The option TAPE_DATA applies only to a tape device.

The /NOCACHE qualifier is effective only if compaction is not enabled. If compaction is enabled (with the /MEDIA_FORMAT=COMPACTION), caching is enabled by default.

If you specify /NOCACHE for a disk device, all caching is disabled for this volume. Note that the /NOCACHE qualifier is equivalent to /CACHE=(NOEXTENT,NOFILE_ID,NOQUOTA,WRITETHROUGH).

If you specify /NOCACHE for a magnetic tape device, the tape controller's write cache is disabled for this volume.

MOUNT /CACHE

Examples

1. \$ MOUNT/CACHE=(EXTENT=60,FILE_ID=60,QUOTA=20,WRITETHROUGH) -
\$ DMA0: FILES WORK
%MOUNT-I-MOUNTED, FILES mounted on _NODE\$DMA0:

This command mounts an RK07 device labeled FILES and assigns the logical name WORK. The /CACHE qualifier enables an extent cache of 60 entries, a file identification cache of 60 entries, and a quota cache of 20; it disables writeback caching.

2. \$ MOUNT/CACHE=TAPE DATA MUA0: TAPE
%MOUNT-I-MOUNTED, TAPE mounted on _NODE\$MUA0:

This command mounts the volume TAPE on device MUA0 and instructs MOUNT to enable the tape controller's write cache for MUA0.

/CLUSTER

Specifies that after the volume is successfully mounted on the local node, or if it is already mounted /SYSTEM on the local node, it is to be mounted on every other node in the existing VMScluster (that is, the volume is mounted clusterwide).

Format

/CLUSTER

Description

Only system or group volumes can be mounted clusterwide. If you specify the /CLUSTER qualifier with neither the /SYSTEM nor the /GROUP qualifier, the default is /SYSTEM. Note that you must use a cluster device-naming convention. Use either *node\$device-name* or *allocation-class\$device-name* as required by your configuration.

You need the user privileges GRPNAM and SYSNAM, respectively, to mount group and system volumes clusterwide.

If the system is not a member of a VMScluster, the /CLUSTER qualifier has no effect.

Example

```
$ MOUNT/CLUSTER DOPEY$DMA1: SNOWWHITE DWARFDISK
%MOUNT-I-MOUNTED, SNOWWHITE          mounted on _DOPEY$DMA1:
$ SHOW DEVICE/FULL DWARFDISK:
```

Disk \$2\$DMA1: (DOPEY), device type RK07, is online, mounted,
file-oriented, device, shareable, served to cluster via MSCP
Server, error logging is enabled.

| | | | |
|------------------|----------|----------------------|------------------------|
| Error count | 0 | Operations completed | 159 |
| Owner process | "" | Owner UIC | [928,49] |
| Owner process ID | 00000000 | Dev Prot | S:RWED,O:RWED,G:RW,W:R |
| Reference count | 1 | Default buffer size | 512 |
| Total blocks | 53790 | Sectors per track | 22 |
| Total cylinders | 815 | Tracks per cylinder | 3 |
| Allocation class | 2 | | |

| | | | |
|--------------------|-------------|----------------------------------|---------------------------|
| Volume label | "SNOWWHITE" | Relative volume number | 0 |
| Cluster size | 3 | Transaction count | 1 |
| Free blocks | 51720 | Maximum files allowed | 6723 |
| Extend quantity | 5 | Mount count | 7 |
| Mount status | System | Cache name | "_\$255\$DWARF1:XQPCACHE" |
| Extent cache size | 64 | Maximum blocks in extent cache | 5172 |
| File ID cache size | 64 | Blocks currently in extent cache | 0 |
| Quota cache size | 25 | Maximum buffers in FCP cache | 349 |

Volume status: subject to mount verification, file high-water marking,
write-through caching enabled.

Volume is also mounted on DOC, HAPPY, GRUMPY, SLEEPY, SNEEZY, BASHFUL.

This MOUNT/CLUSTER command mounts the volume SNOWWHITE on DOPEY\$DMA1, then proceeds to mount the volume clusterwide. The SHOW DEVICE/FULL command displays information about the volume, including the other nodes on which it is mounted.

/COMMENT

Specifies additional information to be included with the operator request when the mount operation requires operator assistance.

Format

/COMMENT=string

Parameter

string

Specifies a text string that is output to the operator log file and the current SYS\$OUTPUT device. The string must contain no more than 78 characters.

Examples

1. \$ MOUNT DYAl: TESTSYS/COMMENT="Volume in cabinet 6."
%MOUNT-I-OPRQST, Please mount volume TESTSYS in device _DYAl:
Volume in cabinet 6.
%MOUNT-I-MOUNTED TESTSYS mounted on _DYAl:
%MOUNT-I-OPRQSTDON, operator request canceled - mount
completed successfully

This command requests the operator to mount the disk volume TESTSYS on the device DYAl. Notice that the /COMMENT qualifier is used to inform the operator of the location of the volume. After the operator places the volume in DYAl, MOUNT retries the operation. After the operation completes, the operator request is canceled.

2. \$ MOUNT DYAl: TESTSYS/COMMENT="Volume in cabinet 6."
%MOUNT-I-OPRQST, Please mount volume TESTSYS in device _DYAl:
Volume in cabinet 6.
%MOUNT-I-OPREPLY, This is a '/pending' response from the operator.
31-DEC-1990 10:27:38.15, request 2 pending by operator TTB6
%MOUNT-I-OPREPLY, This is a '/abort' response from the operator.
31-DEC-1990 10:29:59.34, request 2 aborted by operator TTB6
%MOUNT-F-OPRABORT, mount aborted by operator

This command is the same as in the previous example. However, in this example, because the requested device is in use, the operator aborts the mount.

3. \$ MOUNT DYAO: TESTSYS/COMMENT="Volume in cabinet 6, once again with feeling."
%MOUNT-I-OPRQST, Please mount volume TESTSYS in device _DYAO:
Volume in cabinet 6, once again with feeling.
%MOUNT-I-OPREPLY, Substitute DYAl:
31-DEC-1990 10:43:42.30, request 3 completed by operator TTB6
%MOUNT-I-MOUNTED, TESTSYS mounted on _DYAl:

This command requests the operator to mount the volume TESTSYS on the device DYAO. In this example, the operator notices that the requested device is in use and redirects the mount to device DYAl.

/CONFIRM

Causes MOUNT to pause and request confirmation before performing a copy operation on the specified disk device. Applicable only if you have the volume shadowing option. See *Volume Shadowing for OpenVMS*.

Format

/CONFIRM virtual-unit-name[:] /SHADOW=(physical-dev-name[:][,...])

/NOCONFIRM virtual-unit-name[:] /SHADOW=(physical-dev-name[:][,...])

Description

Controls whether MOUNT issues a request to confirm a full copy operation when mounting a shadow set. The /SHADOW qualifier must be used with the /CONFIRM qualifier. Use /CONFIRM to display the volume label and volume owner for any specified physical device that is a target for a copy operation. MOUNT stops before any copy operations occur and issues the following prompt:

Allow FULL shadow copy on the above member(s)? [N]:

If you respond Y or YES, the mount operation continues automatically with copy operations allowed. If you respond N, NO, <RETURN>, or <Ctrl/Z> the command quits without mounting any of the specified volumes (including volumes that did not require copy operations). If you type a response other than those listed above, MOUNT reissues the prompt.

The /CONFIRM qualifier is similar to /NOCOPY. Use /CONFIRM to mount shadow sets interactively; use /NOCOPY in the site-specific startup command procedure SYS\$MANAGER:SYSTARTUP_VMS.COM.

Example

```
$MOUNT/CONFIRM DSA0:/SHADOW=($200$DKA200:,$200$DKA300:,$200$DKA400:) X5OZCOPY
```

```
%MOUNT-F-SHDWCOPYREQ, shadow copy required
```

```
Virtual Unit - DSA0
```

```
Volume Label - X5OZCOPY
```

```
Member Volume Label Owner UIC
```

```
$200$DKA200: (VIPER1) X5OZCOPY [SYSTEM]
```

```
$200$DKA400: (VIPER1) X5OZCOPY [SYSTEM]
```

```
Allow FULL shadow copy on the above member(s)? [N]: Y
```

```
%MOUNT-I-MOUNTED, X5OZCOPY mounted on _DSA0:
```

```
%MOUNT-I-SHDWMEMSUCC, _$200$DKA300: (VIPER1) is now a valid member of  
the shadow set
```

```
%MOUNT-I-SHDWMEMCOPY, _$200$DKA200: (VIPER1) added to the shadow set  
with a copy operation
```

```
%MOUNT-I-SHDWMEMCOPY, _$200$DKA400: (VIPER1) added to the shadow set  
with a copy operation
```

This command shows how to use the /CONFIRM qualifier to check the status of potential shadow set members before any data is erased. The command instructs MOUNT to build a shadow set with the specified devices, and prompts for permission to perform a copy operation. The response of YES instructs MOUNT to mount the shadow set.

/COPY

Enables or disables copy operations on physical devices specified when you mount a shadow set. Applicable only if you have the volume shadowing option. See *Volume Shadowing for OpenVMS*.

Format

```
/COPY virtual-unit-name[:] /SHADOW=(physical-dev-name:[,][,...])
```

```
/NOCOPY virtual-unit-name[:] /SHADOW=(physical-dev-name:[,][,...])
```


MOUNT /COPY

Description

Instructs MOUNT to perform copy operations on shadow set members. You can mount shadow sets with /NOCOPY to test if proposed shadow set members are targets of copy operations. If any of the specified volumes is a target of a copy operation, the command quits without mounting any of the specified volumes (including those that did not require a copy operation).

The default qualifier is /COPY.

The /NOCOPY qualifier is similar to /CONFIRM. Use /NOCOPY to mount shadow sets in the site-specific startup command procedure SYS\$MANAGER:SYSTARTUP_VMS.COM; use /CONFIRM for interactive mounting.

Example

```
$ MOUNT/NOCOPY DSA2: /SHADOW=($1$DUA4:,$1$DUA6:,$1$DUA7:) -  
_ $ SHADOWVOL DISK$SHADOWVOL  
%MOUNT-F-SHDWCOPYREQ, shadow copy required  
%MOUNT-I-SHDWMEMFAIL, DUA7: failed as a member of the shadow set  
%MOUNT-F-SHDWCOPYREQ, shadow copy required
```

This command shows how to use the /NOCOPY qualifier to check the status of potential shadow set members before any data is erased. The command instructs MOUNT to build a shadow set with the specified devices only if a copy operation is not required. Because the device DUA7 required a copy operation to become a member of the shadow set, the mount failed. You could reissue the command specifying /COPY to instruct MOUNT to build the shadow set providing the necessary copy operation.

/DATA_CHECK

Overrides the read-check or write-check option (or both) specified for a volume when it was initialized.

Format

/DATA_CHECK[(keyword[,...])]

Keywords

READ

Performs checks following all read operations.

WRITE

Performs checks following all write operations.

Description

You can specify either or both of the keywords. If you specify more than one keyword, separate them by commas and enclose the list in parentheses.

If you specify the /DATA_CHECK qualifier without specifying a keyword, MOUNT defaults to /DATA_CHECK=WRITE.

Example

```
$ MOUNT/DATA_CHECK=READ CLEMENS$DBA2: SAM BOOK
```

This command mounts a volume labeled SAM on CLEMENS\$DBA2 and assigns the logical name BOOK. The /DATA_CHECK=READ qualifier overrides a previous INITIALIZE/DATA_CHECK=WRITE specification, so that subsequent read operations on BOOK are subject to data-checking operations.

/DENSITY

Specifies the density (in bits/in) at which a foreign or unlabeled magnetic tape is to be written.

Format

```
[/FOREIGN][/NOLABEL]/DENSITY=n
```

Parameter

n

Specifies a density of 800, 1600, or 6250 bits/in, if supported by the magnetic tape drive. If you do not specify a density for a magnetic tape that was previously written, the density defaults to that of the first record on the volume.

Description

The specified density is used only if you specify /FOREIGN or /NOLABEL and the first operation performed on the magnetic tape is a write.

If you specify /LABEL, or if the first operation on the magnetic tape is a read, the magnetic tape is read or written at the density at which the first record on the magnetic tape is recorded. The default is /LABEL.

Example

```
$ MOUNT/FOREIGN/DENSITY=1600 MFA0: TAPE
```

This command mounts a foreign magnetic tape on drive MFA0 and assigns the logical name TAPE. The /DENSITY qualifier specifies that the magnetic tape is to be written at a density of 1600 bits/in.

/EXTENSION

Specifies the number of blocks by which disk files are to be extended on the volume unless otherwise specified by an individual command or program request.

Format

```
/EXTENSION=n
```


MOUNT /EXTENSION

Parameter

n

Specifies a value from 0 to 65,535 to override the value specified when the volume was initialized.

Example

```
$ MOUNT/EXTENSION=64 DBA0: DOC WORK
```

This command mounts a volume labeled DOC on DBA0, assigns the logical name WORK, and specifies a default block extent of 64 for the files on WORK.

/FOREIGN

Indicates that the volume is not in the standard format used by the OpenVMS operating system.

Format

/FOREIGN

Description

Use the /FOREIGN qualifier when a magnetic tape volume is not in the standard ANSI format, or when a disk volume is not in Files-11 format.

If you mount a volume with the /FOREIGN qualifier, the program you use to read the volume must be able to process the labels on the volume, if any. The OpenVMS operating system does not provide an ancillary control process (ACP) to process the volume.

You must mount DOS-1 and RT-11 volumes with the /FOREIGN qualifier and process them with the Exchange utility (EXCHANGE). See the *OpenVMS Exchange Utility Manual*.

The default protection applied to foreign volumes is RWLP (Read, Write, Logical I/O, Physical I/O) for the system and owner and no access for the group and world. If you also specify /GROUP, group members are also given RWLP access. If you specify /SYSTEM or /SHARE, the group and world are both given RWLP access. Note that the /GROUP, /SYSTEM, and /SHARE qualifiers do not alter the default protection.

If you mount a volume currently in Files-11 format with the /FOREIGN qualifier, you must have the user privilege VOLPRO, or your UIC must match the UIC on the volume.

Examples

1.

```
$ MOUNT/FOREIGN MTA1: ABCD TAPE
```

This command mounts a foreign magnetic tape on drive MTA1.

2. \$ MOUNT/FOREIGN DMA2: SAVEDISK

This command mounts an RK07 device as a foreign volume on DMA2 and assigns the logical name SAVEDISK. As a volume that is not file structured, SAVEDISK can be used for sequential-disk BACKUP save operations.

/GROUP

Makes the volume available to other users with the same group number in their UICs as the user entering the MOUNT command.

Format

/GROUP

Description

The logical name for the volume is placed in the group logical name table. You must have the user privilege GRPNAM to use the /GROUP qualifier.

Note that if the volume is owned by a group other than yours, access may be denied because of the volume protection.

The /GROUP qualifier is not valid for ISO 9660 volume sets.

Examples

1. \$ MOUNT/GROUP DB1:, DB2:, DB3: -
_ \$ PAYVOL1,PAYVOL2,PAYVOL3 PAY

This command mounts and makes available on a group basis the volume set consisting of volumes labeled PAYVOL1, PAYVOL2, and PAYVOL3. The logical name PAY is assigned to the set; anyone wanting to access files on these volumes can refer to the set as PAY.

2. \$ MOUNT/GROUP/BIND=MASTER_PAY -
_ \$ DB4: PAYVOL4

This command adds the volume labeled PAYVOL4 to the existing volume set MASTER_PAY. The root volume for the volume set must be on line when you enter this command.

/HDR3

Controls whether ANSI standard header label 3 is written on a magnetic tape volume.

Format

/HDR3

/NOHDR3

MOUNT /HDR3

Description

By default, header label 3 is written. You can specify the /NOHDR3 qualifier to write magnetic tapes that are to be used on other systems that do not process HDR3 labels correctly.

Example

```
$ INITIALIZE MTA0: ABCD  
$ MOUNT/NOHDR3 MTA0: ABCD
```

The INITIALIZE and MOUNT commands prepare an ANSI-formatted magnetic tape for processing. The /NOHDR3 qualifier specifies that no HDR3 labels are to be written, thus creating a magnetic tape that can be transported to systems that do not process implementation-dependent labels correctly.

/INCLUDE

Automatically reconstructs a former shadow set to the way it was before the shadow set was dissolved. Applicable only if you have the volume shadowing option. See *Volume Shadowing for OpenVMS*.

Format

```
/INCLUDE virtual-unit-name[:] /SHADOW=(physical-device-name:[],[...])  
/NOINCLUDE virtual-unit-name[:] /SHADOW=(physical-device-name:[],[...])
```

Description

Automatically mounts and restores a shadow set to the way it was before a system failure. Supply the exact virtual-unit name that was used when the shadow set was originally mounted. Use the virtual-unit naming format DSA_{nnnn}.

You must also include the /SHADOW qualifier and specify at least one of the disk devices from the original shadow set. Use the standard device-naming format \$allocation-class\$ddcu[:]. Omit the parentheses if you name only one device.

The /INCLUDE qualifier is position independent; it can appear anywhere on the command line.

The default qualifier is /NOINCLUDE.

Example

```
$ MOUNT/INCLUDE DSA0: /SHADOW=$1$DUA10: SHADOWVOL  
%MOUNT-I-MOUNTED, SHADOWVOL mounted on DSA0:  
%MOUNT-I-SHDWMEMSUCC, _$1$DUA10: (MEMBER1) is now a valid member of  
the shadow set  
%MOUNT-I-SHDWMEMCOPY, _$1$DUA11: (MEMBER2) added to the shadow set  
with a copy operation
```

This example shows how to create a shadow set wherein the software determines automatically the shadow set members that should be mounted. The /SHADOW qualifier ensures the correct copy operation for the two shadow set members. In this case, \$1\$DUA10 is the more current volume and becomes the source of the copy operation to \$1\$DUA11.

If the shadow set was properly dismounted and no write I/O requests remain outstanding, the shadow set devices are consistent and are added back without the need for a copy or merge operation. Otherwise, Volume Shadowing for OpenVMS automatically performs a copy or merge operation.

/INITIALIZE=CONTINUATION

Specifies that any volume added to the magnetic tape volume set is initialized before you can write to the volume.

Format

/INITIALIZE=CONTINUATION

Example

```
$ MOUNT/INITIALIZE=CONTINUATION MTA0: ABCD
```

The **/INITIALIZE=CONTINUATION** qualifier instructs the **MOUNT** command to assign its own continuation label. In this case, the operator can enter the command **REPLY/BLANK=n**, and the system assigns a label derived from the original. It uses the label specified in the **MOUNT** command and adds the appropriate number (ABCD02, ABCD03, and so forth).

/LABEL

Indicates that the volume is in the standard format used by the OpenVMS operating system; that is, a magnetic tape volume is in the standard ANSI format, or a disk volume is in Files-11 format.

Format

/LABEL

/NOLABEL

Description

The default is **/LABEL**.

Note that **/NOLABEL** is equivalent to **/FOREIGN**; they both set the **FOREIGN** flag.

Example

```
$ MOUNT/LABEL MFA1: TAPE
```

This command mounts an ANSI-labeled magnetic tape on **MFA1** and assigns the logical name **TAPE**.

MOUNT /MEDIA_FORMAT=CD-ROM

/MEDIA_FORMAT=CD-ROM

Mounts a volume assuming the media to be ISO 9660 (or High Sierra) formatted.

Format

/MEDIA_FORMAT=CD-ROM

Description

The /MEDIA_FORMAT=CD-ROM qualifier instructs the mount subsystem to attempt to mount a volume assuming the media to be ISO 9660 (or High Sierra) formatted.

Note

This qualifier specifies a CD-ROM mount (ISO 9660 or High Sierra). Specify this qualifier when a volume is known to be in either ISO 9660 or High Sierra CD-ROM format.

The Mount utility attempts to read a CD-ROM in Files-11 ODS-2 format by default. This qualifier prevents the Mount utility from attempting a Files-11 ODS-2 mount sequence.

Because it is possible to record parts of a CD-ROM in Files-11 ODS-2 and other parts in ISO 9660 format, this qualifier can be used to specify a CD-ROM mount (ISO 9660 or High Sierra).

/MEDIA_FORMAT=[NO]COMPACTION

Enables and controls data compaction and data record blocking on tape drives that support data compaction.

Format

/MEDIA_FORMAT=[NO]COMPACTION

Description

The /MEDIA_FORMAT qualifier allows you to mount a tape and enable data compaction and record blocking on a tape drive that supports data compaction. Data compaction and record blocking increase the amount of data that can be stored on a single tape.

Records can either be compacted and blocked, or they can be recorded in the same way that they would be recorded on a noncompacting tape drive. Note that for compacting tape drives, once data compaction or noncompaction has been selected for a given tape, that status applies to the entire tape.

For Files-11 tapes, when you enable data compaction, caching is automatically enabled.

Note

The /MEDIA_FORMAT=[NO]COMPACTION qualifier is meaningful only for foreign mounts.

The /MEDIA_FORMAT=[NO]COMPACTION qualifier has no effect on a Files-11 tape. The compaction state of a Files-11 tape is determined by the state established when the tape is initialized.

Examples

1. \$ MOUNT/FOREIGN/MEDIA_FORMAT=COMPACTION MUA0: BOOKS

This command performs a foreign mount of a tape with data compaction and record blocking enabled and assigns the logical name BOOKS to the tape.

2. \$ INIT/MEDIA_FORMAT=NOCOMPACTION MUA0: BOOKS
\$ MOUNT/MEDIA_FORMAT=COMPACTION MUA0: BOOKS

This MOUNT command attempts a Files-11 mount of a tape labeled BOOKS with data compaction and record blocking enabled. Because the tape was initialized with compaction disabled, the MOUNT qualifier /MEDIA_FORMAT=COMPACTION has no effect.

/MESSAGE

Causes mount request messages to be sent to your current SYS\$OUTPUT device.

Format

/MESSAGE

/NOMESSAGE

Description

If you specify /NOMESSAGE during an operator-assisted mount, messages are not output to SYS\$OUTPUT; the operator sees them, however, provided an operator terminal is enabled.

The default is /MESSAGE.

Example

\$ MOUNT/NOMESSAGE DLA0: SLIP DISC

In this example, an RL02 device labeled SLIP is mounted on drive DLA0 and is assigned the logical name DISC. The /NOMESSAGE qualifier disables the broadcast of mount request messages to the user terminal.

MOUNT **/MOUNT_VERIFICATION**

/MOUNT_VERIFICATION

Specifies that the device is a candidate for mount verification.

Format

/MOUNT_VERIFICATION
/NOMOUNT_VERIFICATION

Description

The **/MOUNT_VERIFICATION** qualifier affects the following media:

- Files-11 Structure Level 2 disks (mount verification is not supported for foreign-mounted disks)
- ISO 9660 and High Sierra CD-ROMs
- Foreign and ANSI-labeled magnetic tape volumes

The default is **/MOUNT_VERIFICATION**.

Example

```
$ MOUNT/CACHE=(NOEXTENT,NOFILE_ID,NOQUOTA,WRITETHROUGH) -  
_$_ /NOMOUNT_VERIFICATION DMA0: FILES WORK  
%MOUNT-I-MOUNTED, FILES          mounted on _NODE$DMA0:
```

This command mounts an RK06 or RK07 device labeled **FILES** and assigns the logical name **WORK**. The **/CACHE** qualifier disables extent caching, file identification caching, quota caching, and writeback caching; the **/NOMOUNT_VERIFICATION** qualifier disables mount verification.

/MULTI_VOLUME

For foreign or unlabeled magnetic tape volumes, determines whether you override **MOUNT** volume-access checks. Use **/MULTI_VOLUME** to override access checks on volumes that do not contain labels that **MOUNT** can interpret. If you have software produced before VMS Version 5.0 that processes multiple-volume, foreign-mounted tape volumes without specifically mounting and dismounting each reel, you may now need to mount the first volume with the **/MULTI_VOLUME** qualifier.

Format

/MULTI_VOLUME
/NOMULTI_VOLUME

Description

Use this qualifier when a utility that supports multiple-volume, foreign-mounted magnetic tape sets needs to process subsequent volumes, and these volumes do not contain labels that the OpenVMS Mount utility can interpret.

By default, all tape volumes are subject to the complete access checks of the OpenVMS Mount utility (MOUNT). Some user-written and vendor-supplied utilities used prior to VMS Version 5.0 may mount only the first tape in a foreign tape set. To make these utilities compatible with more recent versions of OpenVMS, alter them to perform explicit calls to the \$MOUNT and \$DISMOU system services for each reel in the set. As an alternative, you can now mount the magnetic tape sets to be used by these utilities with the /MULTI_VOLUME qualifier.

You must specify the /FOREIGN qualifier with the /MULTI_VOLUME qualifier and you must have the user privilege VOLPRO. The default is /NOMULTI_VOLUME.

Note

The OpenVMS Backup utility (BACKUP) explicitly calls the \$MOUNT and \$DISMOU system services on each reel of a foreign-mounted magnetic tape set. For additional information, see the section on multivolume save sets and BACKUP in the *OpenVMS System Management Utilities Reference Manual: A-L*.

Example

```
$ MOUNT/FOREIGN/MULTI_VOLUME MUA0:
```

This command mounts a tape volume set. MOUNT performs an access check on the first volume in the set and proceeds without checks to subsequent reels as they are needed for processing.

/OVERRIDE

Inhibits one or more protection checks that the MOUNT command performs.

Format

/OVERRIDE=(keyword[,...])

Keywords

If you specify more than one keyword, separate them with commas and enclose the list in parentheses.

You need the user privileges OPER and VOLPRO to specify /OVERRIDE=(ACCESSIBILITY, EXPIRATION) along with the /FOREIGN qualifier; otherwise, the magnetic tape is not read.

ACCESSIBILITY

For magnetic tapes only. If the installation allows, this keyword overrides any character in the Accessibility Field of the volume. The necessity of this keyword is defined by the installation. That is, each installation has the option of specifying a routine that the magnetic tape file system will use to process this field. By default, the OpenVMS operating system provides a routine that checks this field in the following manner:

- If the magnetic tape was created on a version of OpenVMS that conforms to Version 3 of ANSI, then you must use this keyword to override any character other than an ASCII space.
- If an OpenVMS protection is specified and the magnetic tape conforms to an ANSI standard that is higher than Version 3, then you must use this keyword to override any character other than an ASCII 1.

To use the ACCESSIBILITY keyword, you must have the user privilege VOLPRO or own the volume.

EXPIRATION

For magnetic tapes only. Allows you to override the expiration dates of a volume and its files. Use this keyword when the expiration date in the first file header label of any file that you want to overwrite has not been reached. You must have the user privilege VOLPRO or your UIC must match the UIC written on the volume.

IDENTIFICATION

Overrides processing of the volume identifier in the volume label. Use this keyword to mount a volume for which you do not know the label, or (on VAX systems) for an ISO 9660 volume whose label is not unique in the first 12 characters. Only the volume identifier field is overridden. Volume protection, if any, is preserved. The volume must be mounted /NOSHARE (either explicitly or by default).

LIMITED_SEARCH

Allows the Mount utility to search an entire device for a home block, if a home block is not found at the expected location. By default, the search for a home block is limited to avoid excessive search times if no valid home block is present.

LOCK

Directs MOUNT not to write-lock the volume as a consequence of certain errors encountered while mounting it. Use this keyword when you are mounting a damaged volume to be repaired using the ANALYZE/DISK_STRUCTURE command. You must have VOLPRO privilege or own the volume to use the LOCK keyword.

NO_FORCED_ERROR

Directs the Mount utility to proceed with shadowing, even though the device or controller does not support forced error handling. Using unsupported SCSI disks can cause members to be removed from a shadow set if certain error conditions arise that cannot be corrected, because some SCSI disks do not implement READL and WRITEL commands that support disk bad block repair.

OWNER_IDENTIFIER

For magnetic tapes only. Overrides the processing of the owner identifier field. Use this keyword to interchange protected magnetic tapes between OpenVMS and other Digital operating systems.

SECURITY

Allows you to continue mounting a volume if an error is returned because the volume has an invalid SECURITY.SYS file. You must have the user privilege VOLPRO or own the volume to use this keyword.

SETID

For magnetic tapes only. Prevents MOUNT from checking the file-set identifier in the first file header label of the first file on a continuation volume. Use this keyword only for ANSI-labeled volumes on which the file-set identifier of the first file on a continuation volume differs from the file-set identifier of the first file of the first volume that was mounted.

SHADOW_MEMBERSHIP

Allows you to override the write protection of former shadow set members. Applicable only if you have the volume shadowing option. See *Volume Shadowing for OpenVMS*.

When you mount a volume with this qualifier, the volume shadowing generation number is erased. If you attempt to remount the volume in a shadow set, the volume is considered an unrelated volume and receives a full copy operation from a current shadow set member. You must have VOLPRO privilege or own the volume to use the LOCK keyword.

Example

```
$ MOUNT/OVERRIDE=IDENTIFICATION MFA0:
```

This command overrides the volume identification field, thus mounting a magnetic tape on MFA0 without a label specification.

/OWNER_UIC

Requests that the specified UIC be assigned ownership of the volume while it is mounted, overriding the ownership recorded on the volume. If you are mounting a volume using the /FOREIGN qualifier, requests an owner UIC other than your current UIC.

Format

/OWNER_UIC=uic

Parameter**UIC**

Specifies the user identification code (UIC) in the following format:

[group,member]

You must use brackets in the UIC specification. The group number is an octal number in the range 0 to 37776; the member number is an octal number in the range 0 to 17776.

To use the /OWNER_UIC qualifier for a Files-11 volume, you must have the user privilege VOLPRO, or your UIC must match the UIC written on the volume.

MOUNT /OWNER_UIC

Example

```
$ MOUNT/OWNER_UIC=[016,360] DRA3: WORK
```

This command mounts a disk device labeled WORK on DRA3 and assigns an owner UIC of [016,360].

/PROCESSOR

For magnetic tapes and Files-11 Structure Level 1 disks, requests that the MOUNT command associate an ancillary control process (ACP) to process the volume. The /PROCESSOR qualifier causes MOUNT to override the default manner in which ACPs are associated with devices.

For Files-11 Structure Level 2 disks, controls block cache allocation.

Format

/PROCESSOR=keyword

Keywords

UNIQUE

Creates a new process to execute the default ancillary control process (ACP) image supporting the magnetic tape, Files-11 ODS-1, ISO 9660, or High Sierra formatted media being mounted.

For Files-11 Structure Level 2 disks, allocates a separate block cache.

SAME:device

Uses an existing process that is executing the same ACP image supporting the magnetic tape, Files-11 ODS-1, ISO 9660, or High Sierra formatted media being mounted.

For Files-11 Structure Level 2 disks, takes the block cache allocation from the specified device.

file-spec

Creates a new process to execute the ACP image specified by the file specification (for example, a modified or a user-written ACP). You cannot use wildcard characters, or node and directory names in the file specification.

To use this keyword, you need CMKRNL and OPER privileges.

You must have the operator user privilege OPER to use the /PROCESSOR qualifier.

Example

```
$ MOUNT/PROCESSOR=SAME:MTA1: MFA0:
```

This command directs MOUNT to mount a magnetic tape on MFA0 using the same ACP process currently associated with MTA1.

/PROTECTION

Specifies the protection code to be assigned to the volume.

Format

/PROTECTION=keyword

Keywords**protection code**

Specifies the protection code according to the standard syntax rules for specifying user protection (that is, system/owner/group/world). If you omit a protection category, that category of user is denied all access.

If you do not specify a protection code, the default is the protection that was assigned to the volume when it was initialized.

XAR

Enables enforcement of the extended record attribute (XAR) access controls. For more information on XAR, see the *OpenVMS Record Management Services Reference Manual*.

DSI

Enables XAR permissions Owner and Group for XARs containing Digital System Identifiers (DSI). For more information, see the *OpenVMS Record Management Services Reference Manual*.

Description

If you specify the /PROTECTION qualifier when you mount a volume with the /SYSTEM or /GROUP qualifier, the specified protection code overrides any access rights implied by the other qualifiers.

If you specify the /FOREIGN qualifier, the execute (E) or create (C) and delete (D) access codes are synonyms for logical I/O (L) and physical I/O (P). You can, however, specify the access codes physical I/O (P) or logical I/O (L), or both, to restrict the nature of input/output operations that different user categories can perform.

To use the /PROTECTION qualifier on a Files-11 volume, you must have the user privilege VOLPRO or your UIC must match the UIC written on the volume.

Example

```
$ MOUNT/PROTECTION=(SYSTEM:RWE,O:RWED,G:RE,W:R) DBA1: WORKDISK
```

This command mounts a device labeled WORKDISK on DBA1 and assigns a protection code. Access to the volume will be read, write, and create for system users; read, write, create, and delete for owner; read and create for group users; and read-only for users in the world category.

/QUOTA

Controls whether quotas are to be enforced on the specified disk volume.

Format

/QUOTA

/NOQUOTA

Description

The default is /QUOTA, which enforces the quotas for each user. The /NOQUOTA qualifier inhibits this checking. To specify the /QUOTA qualifier, you must have the user privilege VOLPRO or your UIC must match the UIC written on the volume.

Example

```
$ MOUNT/OWNER_UIC=[016,360]/NOQUOTA DRA3: WORK
```

This command specifies that the disk volume labeled WORK on DRA3 has an owner UIC of [016,360] and no quotas enforced.

/REBUILD

Controls whether or not MOUNT performs a rebuild operation on a disk volume.

Format

/REBUILD

/NOREBUILD

Description

If a disk volume is improperly dismounted (such as during a system failure), you must rebuild it to recover any caching limits that were enabled on the volume at the time of the dismount. By default, MOUNT attempts the rebuild. For a successful rebuild operation that includes reclaiming all of the available free space, you must mount *all* of the volume set members.

The rebuild may consume a considerable amount of time, depending on the number of files on the volume and, if quotas are in use, on the number of different file owners.

The following caches may have been in effect on the volume before it was dismounted:

- Preallocated free space (EXTENT cache)
- Preallocated file numbers (FILE_ID cache)
- Disk quota usage caching (QUOTA cache)

If caching was in effect for preallocated free space or file numbers, the rebuild time is directly proportional to the greatest number of files that ever existed on the volume at one time. If disk quota caching was in effect, you can expect additional time that is proportional to the square of the number of entries in the disk quota file.

If none of these items were in effect, the rebuild is not necessary and does not occur.

If you use the /NOREBUILD qualifier, devices can be returned to active use immediately. You can then perform the rebuild later with the DCL command SET VOLUME/REBUILD (see the *OpenVMS DCL Dictionary*).

For information about how to rebuild the system disk, refer to the *OpenVMS System Manager's Manual*.

Examples

1. \$ MOUNT/REBUILD NODE\$DBA2: WORKDISK
%MOUNT-I-MOUNTED, WORKDISK mounted on _NODE\$DBA2:
%MOUNT-I-REBUILD, volume was improperly dismounted; rebuild in progress

In this example, the volume WORKDISK is mounted on NODE\$DBA2. Because the volume is found to have been improperly dismounted and the /REBUILD qualifier is in effect, MOUNT displays a message and proceeds to rebuild the volume.

2. \$ MOUNT/NOREBUILD NODE\$DBA2: WORKDISK
%MOUNT-I-MOUNTED, WORKDISK mounted on _NODE\$DBA2:
%MOUNT-I-REBLDREQD, rebuild not performed; some free space unavailable; diskquota usage stale

In this example, the volume WORKDISK is found to have been improperly dismounted, but because the /NOREBUILD qualifier is specified, a rebuild is not performed. Instead, MOUNT displays a message to inform you that the rebuild is needed, and proceeds to make WORKDISK available for use as is. You can rebuild the volume later with the DCL command SET VOLUME /REBUILD.

/RECORDSIZE

Specifies the number of characters in each record of a magnetic tape volume.

Format

/RECORDSIZE=n

Parameter

n

Specifies the block size in the range 20 to 65,532 bytes if you are using OpenVMS RMS, or 18 to 65,534 bytes if you are not using OpenVMS RMS.

MOUNT /RECORDSIZE

Description

You typically use this qualifier with the /FOREIGN and /BLOCKSIZE qualifiers to read or write fixed-length records on a block-structured device. In this case, the record size must be less than or equal to the block size specified or used by default.

Use the /RECORDSIZE qualifier when mounting magnetic tapes without HDR2 labels (such as RT-11 magnetic tapes) to provide OpenVMS RMS with default values for the maximum record size.

Example

```
$ MOUNT/FOREIGN/BLOCKSIZE=512/RECORDSIZE=512 MTA0:
```

In this example, the magnetic tape is mounted on MTA0 with a default block size and record size of 512 characters.

/SHADOW

Binds up to three physical devices into a shadow set represented by the virtual unit named in the command. Applicable only if you have the volume shadowing option. See *Volume Shadowing for OpenVMS*.

Format

virtual-unit-name[:] /SHADOW=(physical-device-name[:][,...])

Description

Indicates that you are mounting a shadow set including the physical devices and the virtual unit that represents them to the system. This qualifier instructs MOUNT to expect a virtual unit name as the *device-name* parameter. Place the /SHADOW qualifier after the *virtual-unit-name* parameter.

Use the virtual unit naming format DSA n , where n is a unique number from 0 to 9999. For the *physical-device-name*, use the standard device-naming format \$allocation-class\$ddcu[:].

Example

```
$ MOUNT DSA0: /SHADOW=($1$DUA10:,$1$DUA11:) SHADOWVOL
%MOUNT-I-MOUNTED, SHADOWVOL mounted on DSA0:
%MOUNT-I-SHDWMEMSUCC, _$1$DUA10: (MEMBER1) is now a valid member of
the shadow set
%MOUNT-I-SHDWMEMCOPY, _$1$DUA11: (MEMBER2) added to the shadow set
with a copy operation
```

This example shows how to create a shadow set wherein the software determines automatically the correct copy operation for the two shadow set members. In this case, \$1\$DUA10 is the more current volume and becomes the source of the copy operation to \$1\$DUA11.

/SHARE

Specifies, for a disk volume, that the volume is shareable.

Format

/SHARE
/NOSHARE

Description

If another user has already mounted the volume shareable, and you request it to be mounted with the /SHARE qualifier, any other qualifiers you enter are ignored.

By default, a volume is not shareable, and the MOUNT command allocates the device on which it is mounted.

If you previously allocated the device and specify the /SHARE qualifier, the MOUNT command deallocates the device so that other users can access it.

Example

```
$ MOUNT/NOMESSAGE/SHARE DLA0: SLIP DISC
```

This command mounts the device labeled SLIP on DLA0, disables broadcasting of MOUNT messages, specifies that the volume is shareable, and assigns the logical name DISC.

/SUBSYSTEM

Enables protected subsystems.

Format

/SUBSYSTEM
/NOSUBSYSTEM

Description

Enables the processing of subsystem ACEs. Requires the SECURITY privilege. By default, the disk from which you boot has /SUBSYSTEM enabled but other disks do not. For further details on subsystems, see the *OpenVMS Guide to System Security*.

Example

```
$ MOUNT/NOMESSAGE/SUBSYSTEM DUA1: SLIP SACH
```

This command mounts the volume labeled SLIP on DUA1 with mount messages disabled. Subsystems on the volume are accessible. MOUNT also assigns the logical name SACH.

MOUNT /SYSTEM

/SYSTEM

Makes the volume public, that is, available to all users of the system, as long as the UIC-based volume protection allows them access.

Format

/SYSTEM

Description

The logical name for the device is placed in the system logical name table. You must have the user privilege SYSNAM to use the /SYSTEM qualifier.

When you mount a volume with the /SYSTEM qualifier in a VMSccluster system, you must use a volume label that is unique clusterwide, even if the specified volume is not mounted clusterwide.

Examples

1. `$ MOUNT/NOMESSAGE/SYSTEM DUA1: SLIP SACH`

This command mounts the volume labeled SLIP on DUA1 with mount messages disabled. The volume is made available systemwide. MOUNT also assigns the logical name SACH.

2. `$ MOUNT/SYSTEM/BIND=MASTER_PAY -
_ $ DB1:,DB2:,DB3: PAYVOL1,PAYVOL2,PAYVOL3`

This command creates the volume set named MASTER_PAY consisting of the initialized volumes labeled PAYVOL1, PAYVOL2, and PAYVOL3. These volumes are mounted physically on the devices named DB1, DB2, and DB3, respectively. The volume PAYVOL1 is the root volume of the set.

The volumes are mounted as system volumes to make them available to all users.

/UCS_SEQUENCE

Supplies the escape sequence to select the coded graphic character set, a requirement when mounting an ISO 9660 volume for one of the Supplementary Volume Descriptors (SVDs).

Format

/UCS_SEQUENCE=(ESCAPE_SEQUENCE)

Parameter

ESCAPE_SEQUENCE

A character sequence defined by the vendor who mastered the CD-ROM and is unique to the vendor's character set conversion tables.

Description

Use the /UCS_SEQUENCE qualifier when mounting an ISO 9660 CD-ROM that contains non-ASCII character sets on OpenVMS.

An ISO 9660 volume may contain an SVD that specifies a graphic character set. This graphic character, when selected at mount time, is used as default character set when displaying a volume's directories and file names.

The /UCS_SEQUENCE qualifier defines the escape sequence to select the coded graphic character set.

All ISO 9660 volumes contain a Primary Volume Descriptor (PVD) that uses ASCII (ISO 646-IRV) as the character set. Both ISO 9660 and OpenVMS filenaming conventions use the same subset of ASCII characters when displaying a volume's directories and file names.

/UNDEFINED_FAT

Establishes default file attributes to be used for records on ISO 9660 media for which no record format has been specified.

Format

/UNDEFINED_FAT=record-format:[record-attributes:][record-size]

Parameters

record-format

Specifies the format for all records in a file: FIXED, VARIABLE, STREAM, STREAM_LF, STREAM_CR, LSB_VARIABLE, or MSB_VARIABLE. For a description of these record formats, see the discussion of the RMS field FAB\$B_RFM in the *OpenVMS Record Management Services Reference Manual*.

record-attributes

Specifies the attributes for all records in a file: NONE, CR, FTN, PRN, NOBKS. Applies only to non-STREAM record formats. For a description of these record attributes, see the discussion of the RMS field FAB\$B_RAT in the *OpenVMS Record Management Services Reference Manual*.

record-size

Specifies the maximum record size for all records in a file: 0 to 32767. Applies only to FIXED or STREAM record formats. For a description of possible RMS record sizes, see the discussion of the RMS field FAB\$W_MRS in the *OpenVMS Record Management Services Reference Manual*.

Description

ISO 9660 media can be mastered from platforms that do not support semantics of files containing predefined record formats. The /UNDEFINED_FAT qualifier establishes default file attributes to be used for records on ISO 9660 media for which no record format has been specified.

The /UNDEFINED_FAT qualifier is valid only in conjunction with the /MEDIA_FORMAT=CD-ROM qualifier.

MOUNT /UNDEFINED_FAT

This qualifier temporarily overrides *all* undefined file types, replacing them with selectable record formats having selectable record attributes and selectable record sizes as shown in the following illustration:

record_formats {
 FIXED:record-attributes[, ...]:record-size
 VARIABLE:record-attributes[, ...]
 STREAM:record-size
 STREAM_LF:record-size
 STREAM_CR:record-size
 LSB_VARIABLE:record-attributes[, ...]
}

record_attributes {
 NONE - None
 CR - Carriage_return
 FTN - Fortran
 PRN - Print
 NOBKS - No-Block-Span
}

record_size { 1 to 32767 }

Example

```
$ MOUNT/MEDIA_FORMAT=CDROM/UNDEFINED_FAT=(FIXED:CR:80) DBA1: OFFENS STRAT
```

In this example, the volume labeled OFFENS is mounted on DBA1 and all files on the volume are defined to be fixed length, carriage return, and 80 bytes in length. MOUNT also assigns the logical name STRAT.

/UNLOAD

Controls whether or not the disk or magnetic tape volume or volumes specified in the MOUNT command are unloaded when they are dismounted. The default is /UNLOAD.

Format

/UNLOAD.

/NOUNLOAD

Example

```
$ MOUNT/NOUNLOAD DBA1: OFFENS STRAT
```

In this example, the volume labeled OFFENS is mounted on DBA1 with the /NOUNLOAD qualifier so that it can be dismounted without being physically unloaded. MOUNT also assigns the logical name STRAT.

/WINDOWS

Specifies the number of mapping pointers to be allocated for file windows.

Format

/WINDOWS=n

Parameter

n

Specifies a value from 7 to 80 that overrides the default value specified when the volume was initialized.

Description

When a file is opened, the file system uses the mapping pointers to access data in the file. Use **MOUNT/WINDOWS** to override the default value specified when the volume was initialized. If no value was specified at volume initialization, the default number of mapping pointers is 7.

You must have the operator user privilege (OPER) to use the **/WINDOWS** qualifier.

Example

```
$ MOUNT/SYSTEM/WINDOWS=25 DBA2: GONWITH THE_WINDOW
```

This command makes the volume labeled **GONWITH** on **DBA2** available systemwide and assigns the logical name **THE_WINDOW**. You override the default number of mapping pointers by specifying a value of 25 for the **/WINDOWS** qualifier.

/WRITE

Controls whether the volume can be written.

Format

/WRITE

/NOWRITE

Description

By default, a volume is considered read/write when it is mounted. You can specify **/NOWRITE** to provide read-only access to protect files. This is equivalent to write-locking the device.

MOUNT /WRITE

Example

```
$ MOUNT/CLUSTER/NOWRITE NODE$DBA1: BOOKS
```

This command mounts a volume labeled BOOKS on NODE\$DBA1 and then proceeds to mount it on each node in the existing VMScluster. The /NOWRITE qualifier makes the volume available for read-only access.

MOUNT Examples

The following examples describe how to use the Mount utility with and without operator assistance.

For examples 1 and 2, operator assistance is not required, assuming the volumes are in the drives. Examples 3 to 6 describe operator-assisted mounts. Examples 7 and 8 describe mounting ISO 9660 CD-ROM volume sets, example 9 makes subsystems on a volume accessible, and example 10 demonstrates mounting a shadow set.

1.

```
$ MOUNT MTA0: MATH06 STAT_TAPE
%MOUNT-I-MOUNTED, MATH06 mounted on _MTA0:
$ COPY ST061178.DAT STAT_TAPE:
```

This MOUNT command requests the magnetic tape whose volume label is MATH06 to be mounted on the device MTA0 and assigns the logical name STAT_TAPE to the volume.

Subsequently, the COPY command copies the disk file ST061178.DAT to the magnetic tape.

2.

```
$ ALLOCATE DM:
%DCL-I-ALLOC, _DMB2: allocated
$ MOUNT DMB2: TEST_FILES
%MOUNT-I-MOUNTED, TEST_FILES mounted on _DMB2:
```

This ALLOCATE command requests an available RK06/RK07 device. After the response from the ALLOCATE command, the physical volume can be placed on the allocated device. Then, the MOUNT command mounts the volume.

3.

```
$ MOUNT DM: TEST_FILES
%MOUNT-I-OPRQST, Please mount volume TEST_FILES in device _DMB2:
%MOUNT-I-MOUNTED, TEST_FILES mounted on _DMB2:
```

This example achieves the same result as the series of commands in the preceding example. The MOUNT command requests an available RK06/RK07 device for the volume labeled TEST_FILES. After the volume is physically mounted in the device named in the response from MOUNT, the system completes the operation. Note that the device is automatically allocated by MOUNT.

4.

```
$ MOUNT DYAl: TESTSYS
%MOUNT-I-OPRQST, Please mount volume TESTSYS in device DYAl:
[Ctrl/Y]
$ EXIT
%MOUNT-I-OPRQSTCAN, operator request canceled
```

This MOUNT command requests the operator to mount the volume TESTSYS on the device DYAl. In this example, the user cancels the mount by pressing Ctrl/Y. Notice that the image must exit before the mount request is actually canceled. Here, the EXIT command causes the image to exit. However, any command that is not performed within the command interpreter causes the current image to exit.

5.

```
$ MOUNT DYAl: TESTSYS
%MOUNT-I-OPRQST, Device _DYAl: is not available for mounting.
%MOUNT-I-OPRQSTCAN, operator request canceled
%MOUNT-I-OPRQST, Please mount volume TESTSYS in device _DYAl:
%MOUNT-I-MOUNTED, TESTSYS mounted on _DYAl:
%MOUNT-I-OPRQSTDON, operator request canceled - mount
completed successfully
```

This MOUNT command requests the operator to mount the volume TESTSYS on the device DYAl. Because DYAl is allocated to another user, the device cannot be mounted. In this case, the user can wait for the device to become available, redirect the mount to another device, or abort the mount. Here, the user remains in operator-assisted mount waiting for the process that is using the device to deallocate it. At this point, because the device is available but no volume is mounted, the original mount request is canceled, and a new request to mount TESTSYS is issued. Finally, the operator places the volume in the drive and lets MOUNT retry the mount. When the mount completes, the request is canceled.

6.

```
$ MOUNT DYAl: TESTSYS/COMMENT="Is there an operator around?"
%MOUNT-I-OPRQST, Please mount volume TESTSYS in device _DYAl:
Is there an operator around?
%MOUNT-I-NOOPR, no operator available to service request
.
.
.
%MOUNT-I-MOUNTED, TESTSYS mounted on _DYAl:
%MOUNT-I-OPRQSTDON, operator request canceled - mount
completed successfully
```

This MOUNT command requests the operator to mount the volume TESTSYS on the device DYAl. In this example, no operator is available to service the request. At this point, the user can abort the mount by pressing Ctrl/Y, or wait for an operator. Here, the user waited, and an operator eventually became available to service the request.

7.

```
$ MOUNT/SYSTEM/MEDIA=CDROM $1$DKA1 USER
%MOUNT-I-CDROM_ISO, USER:VMS_ONLINE_DOCUMENTATION (1 of 4) ,
mounted on _$1$DKA1: (CDROM)

$ MOUNT/SYSTEM/MEDIA=CDROM $1$DKA2 PROGRAMMING_1
%MOUNT-I-CDROM_ISO, PROGRAMMING_1:VMS_ONLINE_DOCUMENTATION (2 of 4) ,
mounted on _$1$DKA2: (CDROM)

$ MOUNT/SYSTEM/MEDIA=CDROM $1$DKA3 PROGRAMMING_2
%MOUNT-I-CDROM_ISO, PROGRAMMING_2:VMS_ONLINE_DOCUMENTATION (3 of 4) ,
mounted on _$1$DKA3: (CDROM)

MOUNT/SYSTEM/MEDIA=CDROM $1$DKA4 MANAGEMENT
%MOUNT-I-CDROM_ISO, MANAGEMENT:VMS_ONLINE_DOCUMENTATION (4 of 4) ,
mounted on _$1$DKA4: (CDROM)
```

These commands mount each member of a four-member ISO 9660 volume set whose volume-set name is VMS_ONLINE_DOCUMENTATION.

8. \$ MOUNT/SYSTEM/MEDIA=CDROM \$1\$DKA1,\$1\$DKA2,\$1\$DKA3,\$1\$DKA4
 USER,PROGRAMMING_1,PROGRAMMING_2,MANAGEMENT
 %MOUNT-I-CDROM ISO, USER:VMS_ONLINE_DOCUMENTATION (1 of 4) , mounted on
 _\$1\$DKA1: (CDROM)
 %MOUNT-I-CDROM ISO, PROGRAMMING_1:VMS_ONLINE_DOCUMENTATION (2 of 4) ,
 mounted on _\$1\$DKA2: (CDROM)
 %MOUNT-I-CDROM ISO, PROGRAMMING_2:VMS_ONLINE_DOCUMENTATION (3 of 4) ,
 mounted on _\$1\$DKA3: (CDROM)
 %MOUNT-I-CDROM ISO, MANAGEMENT:VMS_ONLINE_DOCUMENTATION (4 of 4) ,
 mounted on _\$1\$DKA4: (CDROM)

This command mounts four members of an ISO 9660 volume set whose volume set name is VMS_ONLINE_DOCUMENTATION.

9. \$ MOUNT/SYSTEM/SUBSYSTEM \$8\$DKA300: ATLANTIS_WORK1
 %MOUNT-I-MOUNTED, ATLANTIS_WORK1 mounted on _\$8\$DKA300: (ATLANTIS)
 \$ SHOW DEVICE/FULL \$8\$DKA300:

Disk \$8\$DKA300: (ATLANTIS), device type RZ24, is online, mounted,
 file-oriented device, shareable, served to cluster via MSCP Server,
 error logging is enabled.

| | | | |
|--------------------|------------------|----------------------------------|-----------------------------|
| Error count | 0 | Operations completed | 385 |
| Owner process | "" | Owner UIC | [SYSTEM] |
| Owner process ID | 00000000 | Dev Prot | S:RWPL,O:RWPL,G:R,W |
| Reference count | 1 | Default buffer size | 512 |
| Total blocks | 409792 | Sectors per track | 38 |
| Total cylinders | 1348 | Tracks per cylinder | 8 |
| Allocation class | 8 | | |
| Volume label | "ATLANTIS_WORK1" | Relative volume number | 0 |
| Cluster size | 3 | Transaction count | 1 |
| Free blocks | 396798 | Maximum files allowed | 51224 |
| Extend quantity | 5 | Mount count | 1 |
| Mount status | System | Cache name | "_ \$8\$DKA700:XQPCACHE" |
| Extent cache size | 64 | Maximum blocks in extent cache | 39679 |
| File ID cache size | 64 | Blocks currently in extent cache | 0 |
| Quota cache size | 50 | Maximum buffers in FCP cache | 295 |
| Volume owner UIC | [VMS,PLATO] | Vol Prot | S:RWCD,O:RWCD,G:RWCD,W:RWCD |

Volume status: subject to mount verification, protected subsystems enabled,
 file high-water marking, write-through caching enabled.

The MOUNT command mounts a volume labeled ATLANTIS_WORK1, which is available systemwide. Subsystems on the volume are accessible.

10. \$ MOUNT DSA0: /SHADOW=(\$200\$DKA200:,\$200\$DKA300:,\$200\$DKA400:) X5OZCOPY
 %MOUNT-I-MOUNTED, X5OZCOPY mounted on DSA0:
 %MOUNT-I-SHDWMEMSUC, _\$200\$DKA200: (VIPER1) is now a valid member of
 the shadow set
 %MOUNT-I-SHDWMEMSUC, _\$200\$DKA300: (VIPER1) is now a valid member of
 the shadow set
 %MOUNT-I-SHDWMEMSUC, _\$200\$DKA400: (VIPER1) is now a valid member of
 the shadow set
 \$ DISMOUNT DSA0:
 \$ MOUNT/INCLUDE DSA0: /SHADOW=\$200\$DKA200: X5OZCOPY
 %MOUNT-I-MOUNTED, X5OZCOPY mounted on DSA0:
 %MOUNT-I-SHDWMEMSUC, _\$200\$DKA200: (VIPER1) is now a valid member of
 the shadow set
 %MOUNT-I-AUTOMEMSUC, _\$200\$DKA300: (VIPER1) automatically added to the
 shadow set
 %MOUNT-I-AUTOMEMSUC, _\$200\$DKA400: (VIPER1) automatically added to the
 shadow set

In this example, an existing shadow set is mounted in two ways. The

MOUNT Examples

first MOUNT command specifies each member of the shadow set with the /SHADOW qualifier. Then, after DSA0: is dismounted, the second MOUNT command uses the /INCLUDE qualifier to automatically mount all members of the shadow set.

POLYCENTER Software Installation Utility

PRODUCT Description

The POLYCENTER Software Installation utility (PRODUCT) is used to install or remove layered software products, register products, set up configuration choices offered by products, and extract a product's release notes.

Although the PRODUCT commands described in this section are for use with the DCL interface, the POLYCENTER Software Installation utility also provides a Motif interface, which is available on a workstation or an X terminal running DECwindows Motif for OpenVMS. See the *OpenVMS System Manager's Manual* for information on using the POLYCENTER Software Installation utility in DECwindows Motif.

PRODUCT Usage Summary

The POLYCENTER Software Installation utility installs, removes, and performs other operations on layered software products.

Format

PRODUCT [subcommand product-name [/qualifiers]]

Parameters

subcommand

Specifies an operation you want the POLYCENTER Software Installation utility to perform. If you do not specify a subcommand, and you are using a workstation or an X terminal running DECwindows Motif, the **PRODUCT** command starts the utility's DECwindows Motif interface.

product-name

Specifies the name of the product to which you want to apply the activity. Some subcommands do not require this parameter. You can use the asterisk (*) and the percent sign (%) wildcard characters for all or part of the *product-name*. You can specify a list of products separated by commas (,).

Usage Summary

To use the POLYCENTER Software Installation utility from the DCL prompt, enter the **PRODUCT** command, a subcommand, a product name, and optional qualifiers. For example:

```
$ PRODUCT INSTALL COBOL/VERSION=5.0
```

You can use the **PRODUCT** commands in command procedure files.

You can also use the utility with the Motif interface, if you have a workstation or an X terminal running DECwindows Motif for OpenVMS. To start the Motif interface for the POLYCENTER Software Installation utility, enter the **PRODUCT** command at the DCL prompt; do not use subcommands:

```
$ PRODUCT
```

When the Motif interface starts, it displays the main window of the POLYCENTER Software Installation utility. See the *OpenVMS System Manager's Manual* for information on using the DECwindows Motif interface.

PRODUCT Commands

The following PRODUCT commands are described in this section.

| | |
|-----------------------|---|
| CONFIGURE | Creates a product configuration file (PCF) |
| COPY | Copies a software product kit |
| EXTRACT RELEASE_NOTES | Accesses the release notes for a selected product |
| FIND | Displays the name of product kits found in a specified directory |
| INSTALL | Installs one or more software products |
| RECONFIGURE | Modifies the configuration choices for an installed product |
| REGISTER PRODUCT | Records product information in the product database |
| REGISTER VOLUME | Records a volume label change of the volume containing the installed products |
| REMOVE | Removes a product from the system and from the product database |
| SHOW HISTORY | Displays a log of operations performed on software products |
| SHOW OBJECT | Displays information about objects created during software product installation |
| SHOW PRODUCT | Displays information about installed products |

CONFIGURE

Creates a product configuration file (PCF) for one or more products. Optionally uses the values in an existing PCF to create the new PCF.

Format

PRODUCT CONFIGURE product-name[...] [/qualifiers]

Parameter

product-name

Names the product, or list of products, for which product configuration files will be generated.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

PRODUCT CONFIGURE

/CONFIGURATION=(keyword[,...])

Specifies how the configuration choices will be supplied. Keywords are:

CURRENT This is the default. It uses values from the product database, which contains the current values recorded for the latest version of the product.

PRODUCER Uses values specified by the software manufacturer for this version of the product.

INPUT=pcf-name Uses values from the specified product configuration file.

OUTPUT=pcf-name Writes configuration choices to the specified product configuration file. If no file name is supplied, creates a file named **DEFAULT.PCSI\$CONFIGURATION**.

The keywords **CURRENT**, **PRODUCER**, and **INPUT** are mutually exclusive. Each of these, however, can be used with the keyword **OUTPUT**. If you specify only one keyword, you can omit the parentheses.

/HELP

/NOHELP (default)

Controls whether detailed explanations of product options and informational text are displayed. The first time you install a product, these explanations can help you decide which options to select. When you perform subsequent installations or upgrades, you might choose the brief explanations to save time.

If you choose or default to **/NOHELP**, you can request a detailed explanation about a question by performing one of the following actions at the prompt:

- Pressing the Help key or PF2 key
- Typing H and pressing the Return key

/LOG

/NOLOG (default)

Displays messages as the **POLYCENTER** Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the **POLYCENTER** Software Installation utility database, corrupt installed products, or cause other problems. In some cases, **/REMOTE** can be useful with the **CONFIGURE** and **SHOW** commands.

When you use /REMOTE, the following logical names must be defined:

- PCSI\$SYSDEVICE must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.
- PCSI\$SPECIFIC must point to a system root on PCSI\$SYSDEVICE. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE:[SYS*x*]

Note that the definition of PCSI\$SYSDEVICE and PCSI\$SPECIFIC specify only where the utility will find or place its database. These logical names do not affect the /DESTINATION qualifier.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If /SOURCE is not specified, the utility searches in the location defined by the logical name PCSI\$SOURCE. If PCSI\$SOURCE is not defined, and the /SOURCE qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

Example

```
$ PRODUCT CONFIGURE EDITOR -
_$ /CONFIGURATION=(INPUT=EDITOR_REV1.PCF,OUTPUT=EDITOR_REV2.PCF)
```

The command in this example reads an existing PCF named EDITOR_REV1.PCF for a product named EDITOR and then saves your changes in EDITOR_REV2.PCF.

COPY

Manipulates a product distribution kit by either creating a sequential copy from a reference copy, creating a reference copy from a sequential copy, or creating a copy without changing the format. You must supply the /DESTINATION qualifier.

Format

PRODUCT COPY product-name /DESTINATION=device:[directory] [/qualifiers]

Parameter

product-name

Names the product, or list of products, to copy.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

PRODUCT COPY

/DESTINATION=device-name:[directory-name]

Specifies a location where the utility will place a copy of a sequential kit, or the top-level directory location where the utility will place files from a reference kit copy. If the device-name is not provided, it defaults to the user's default device. If the directory-name is omitted, it defaults to the user's default directory.

This is a required qualifier for the PRODUCT COPY command. The logical name PCSI\$DESTINATION is not used.

/FORMAT=keyword

Specifies the output format of the product kit. Keywords are:

REFERENCE Reference format in which product files are placed in a directory tree.

SEQUENTIAL Sequential format in which product files are placed in *full-product-name.PCSI*, a container file.

The default is to preserve the format of the product kit.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/OWNER_UIC=uic

Specifies the owner user identification code (UIC) for files created during a copy operation. By default, the user executing the operation owns the software product files. For example, if you are logged in to your own account, you can use this qualifier during a copy operation to assign ownership of the product files to SYSTEM rather than to your own account. Specify the UIC in alphanumeric format (in the form [name]) or in octal group-member format (in the form [g,m]). UIC formats are described in the *OpenVMS User's Manual*.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If /SOURCE is not specified, the utility searches in the location defined by the logical name PCSI\$SOURCE. If PCSI\$SOURCE is not defined, and the /SOURCE qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

Example

```
$ PRODUCT COPY ABC/SOURCE=[SHERMAN.ABC] -  
_ $ /DESTINATION=[KITS]/FORMAT=SEQUENTIAL
```

The command in this example converts PRODUCT ABC to a sequential copy in the [KITS] directory.

EXTRACT RELEASE_NOTES

Accesses the release notes for the selected product or group of products. If no output file name is given, the release notes are written to a file named DEFAULT.PCSI\$RELEASE_NOTES in the user's default directory.

Format

PRODUCT EXTRACT RELEASE_NOTES product-name[...] [/qualifiers]

Parameter

product-name

Names the product, or list of products, from which to extract release notes.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

/FILE=filespec

Specifies the name of the output file that will contain the release notes. If no file name is given, the release notes are written to a file named DEFAULT.PCSI\$RELEASE_NOTES in the current directory.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If /SOURCE is not specified, the utility searches in the location defined by the logical name PCSI\$SOURCE. If PCSI\$SOURCE is not defined, and the /SOURCE qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

/WORK=device:[directory]

Specifies the name of the device and directory acting as a temporary work area. By default, temporary files are created in the current working directory.

PRODUCT EXTRACT RELEASE_NOTES

Example

```
$ PRODUCT EXTRACT RELEASE_NOTES XYZ/VERSION=2.3/FILE=[RN]XYZ.TXT
```

The command in this example places the release notes for Version 2.3 of the product XYZ in a file named [RN]XYZ.TXT.

FIND

Displays the names of software product kits located in the specified directory.

Format

```
PRODUCT FIND product-name[...] [/qualifiers]
```

Parameter

product-name

Names the product, or list of products to find.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If /SOURCE is not specified, the utility searches in the location defined by the logical name PCSI\$SOURCE. If PCSI\$SOURCE is not defined, and the /SOURCE qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

Example

```
$ PRODUCT FIND TEST*/BASE_SYSTEM=VAXVMS
```

The command in this example examines all software product kits located in the user's default directory and displays the names of all versions of products whose name begins with "TEST" and that can be installed on OpenVMS VAX.

INSTALL

Installs one or more software products on your system.

Format

```
PRODUCT INSTALL product-name[...] [/qualifiers]
```

Parameter

product-name

Names the product, or list of products, to install.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

/CONFIGURATION=(keyword[,...])

Specifies how the configuration choices will be supplied. Keywords are:

CURRENT

This is the default. It uses values from the product database, which has the current values recorded for the latest version of the product.

PRODUCER

Uses values specified by the software manufacturer for this version of the product.

INPUT=pcf-name

Uses values from the specified product configuration file.

OUTPUT=pcf-name

Writes configuration choices to the specified product configuration file. If no file name is supplied, creates a file named DEFAULT.PCSI\$CONFIGURATION.

The keywords CURRENT, PRODUCER, and INPUT are mutually exclusive. Each of these, however, can be used with the keyword OUTPUT. If you specify only one keyword, you can omit the parentheses.

PRODUCT INSTALL

/DESTINATION=device-name:[directory-name]

Specifies a location where the utility will install software product files. If you omit the device name, the utility uses your current default device. If you omit the directory name, the utility uses the [VMS\$COMMON] directory as the default directory.

If you do not use this qualifier to specify a destination, the utility installs the software in the location defined by logical name PCSI\$DESTINATION. If this logical name is not defined, the utility installs the software in SYS\$SYSDEVICE:[VMS\$COMMON], the top-level directory for software product files.

/HELP

/NOHELP (default)

Controls whether detailed explanations of product options and informational text are displayed. The first time you install a product, these explanations can help you decide which options to select. When you perform subsequent installations or upgrades, you might choose the brief explanations to save time.

If you choose or default to /NOHELP, you can request a detailed explanation about a question by performing one of the following actions at the prompt:

- Pressing the Help key or PF2 key
- Typing H and pressing the Return key

/KEEP (default)

/NOKEEP

Keeps the previous version of a software product when an upgrade makes a newer version of that product available across the entire system. By default, the POLYCENTER Software Installation utility deletes previous versions of a product. For example, if you make Version 2.2 of a product available to all nodes in the cluster, the POLYCENTER Software Installation utility deletes Version 2.1 unless you use the /KEEP qualifier. If Version 2.2 is available to only some nodes in the cluster, the utility does not delete Version 2.1.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/REMARK=string

Records a comment in the product database about the task you are performing. The SHOW HISTORY command displays the recorded comments. For each product, the POLYCENTER Software Installation utility stores a chronological list of tasks you perform and the associated remarks. The default behavior is that no remark is recorded.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software

Installation utility database, corrupt installed products, or cause other problems. In some cases, /REMOTE can be useful with the CONFIGURE and SHOW commands.

When you use /REMOTE, the following logical names must be defined:

- PCSI\$SYSDEVICE must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.
- PCSI\$SPECIFIC must point to a system root on PCSI\$SYSDEVICE. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE: [SYS*x*]

Note that the definition of PCSI\$SYSDEVICE and PCSI\$SPECIFIC specify only where the utility will find or place its database. These logical names do not affect the /DESTINATION qualifier.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If /SOURCE is not specified, the utility searches in the location defined by the logical name PCSI\$SOURCE. If PCSI\$SOURCE is not defined, and the /SOURCE qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/TEST (default)

/NOTEST

Requests that the POLYCENTER Software Installation utility run the installation verification procedure (IVP) for the product.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

/WORK=device:[directory]

Specifies the name of the device and directory acting as a temporary work area. By default, temporary files are created in the current working directory.

Example

```
$ PRODUCT INSTALL POSIX/VERSION=2.0/CONFIGURATION=OUTPUT=POSIX.PCF
```

The command in this example creates a new product configuration file during the installation of POSIX Version 2.0.

PACKAGE

Creates a software product kit. This operation uses a product description file (PDF), an optional product text file (PTF), and product material files as input to produce a software product kit in either sequential or reference format. Information about the PRODUCT PACKAGE command is available by entering the following DCL command:

```
$ HELP PRODUCT PACKAGE
```

A description of how to package kits is in the optional manual, *POLYCENTER Software Installation Utility Developer's Guide*.

PRODUCT RECONFIGURE

RECONFIGURE

Modifies the active configuration choices for an installed product based on the installation options from the product kit and the responses from the user.

Format

PRODUCT RECONFIGURE product-name[,...] [/qualifiers]

Parameter

product-name

Names the product, or list of products, to reconfigure.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

/CONFIGURATION=(keyword[,...])

Specifies how the configuration choices will be supplied. Keywords are:

CURRENT

This is the default. It uses values from the product database, which has the current values recorded for the latest version of the product.

PRODUCER

Uses values specified by the software manufacturer for this version of the product.

INPUT=pcf-name

Uses values from the specified product configuration file.

OUTPUT=pcf-name

Writes configuration choices to the specified product configuration file. If no file name is supplied, creates a file named DEFAULT.PCSI\$CONFIGURATION.

The keywords CURRENT, PRODUCER, and INPUT are mutually exclusive. Each of these, however, can be used with the keyword OUTPUT. If you specify only one keyword, you can omit the parentheses.

/HELP

/NOHELP (default)

Controls whether detailed explanations of product options and informational text are displayed. The first time you install a product, these explanations can help you decide which options to select. When you perform subsequent installations or upgrades, you might choose the brief explanations to save time.

If you choose or default to **/NOHELP**, you can request a detailed explanation about a question by performing one of the following actions at the prompt:

- Pressing the Help key or PF2 key
- Typing H and pressing the Return key

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/REMARK=string

Records a comment in the product database about the task you are performing. The SHOW HISTORY command displays the recorded comments. For each product, the POLYCENTER Software Installation utility stores a chronological list of tasks you perform and the associated remarks. The default behavior is that no remark is recorded.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, **/REMOTE** can be useful with the **CONFIGURE** and **SHOW** commands.

When you use **/REMOTE**, the following logical names must be defined:

- **PCSI\$SYSDEVICE** must point to the target system disk. This disk must be mounted and allocated to the process executing the **PRODUCT** command.
- **PCSI\$SPECIFIC** must point to a system root on **PCSI\$SYSDEVICE**. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE: [SYS*x*]

Note that the definition of **PCSI\$SYSDEVICE** and **PCSI\$SPECIFIC** specify only where the utility will find or place its database.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If **/SOURCE** is not specified, the utility searches in the location defined by the logical name **PCSI\$SOURCE**. If **PCSI\$SOURCE** is not defined, and the **/SOURCE** qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/TEST (default)

/NOTEST

Requests that the POLYCENTER Software Installation utility run the installation verification procedure (IVP) for the product.

PRODUCT RECONFIGURE

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

/WORK=device:[directory]

Specifies the name of the device and directory acting as a temporary work area. By default, temporary files are created in the current working directory.

Example

```
$ DEFINE PCSI$SOURCE DKA500:[DWMOTIF.KIT]
$ PRODUCT RECONFIGURE DWMOTIF/VERSION=V1.2-3
```

The command in this example enters into a dialog with the user to change the configuration options for the product DECwindows Motif Version 1.2-3.

REGISTER PRODUCT

Registers, in the database, one or more products that have been installed on the system by a mechanism other than the POLYCENTER Software Installation utility.

Format

PRODUCT REGISTER PRODUCT product-name[...] [/qualifiers]

Parameter

product-name

Names the product, or list of products, to register.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

/DESTINATION=device-name:[directory-name]

Specifies the location where the installed product resides. If you omit the device name, the utility uses your current default device. If you omit the directory name, the utility uses the [VMS\$COMMON] directory as the default directory.

If you do not use this qualifier to specify a destination, the utility uses the location defined by logical name PCSI\$DESTINATION. If this logical name is not defined, the utility uses the location SYS\$SYSDEVICE:[VMS\$COMMON], the top-level directory.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/REMARK=string

Records a comment in the product database about the task you are performing. The SHOW HISTORY command displays the recorded comments. For each product, the POLYCENTER Software Installation utility stores a chronological list of tasks you perform and the associated remarks. The default behavior is that no remark is recorded.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, /REMOTE can be useful with the CONFIGURE and SHOW commands.

When you use /REMOTE, the following logical names must be defined:

- PCSI\$SYSDEVICE must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.
- PCSI\$SPECIFIC must point to a system root on PCSI\$SYSDEVICE. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE:[SYS*x*]

Note that the definition of PCSI\$SYSDEVICE and PCSI\$SPECIFIC specify only where the utility will find or place its database. These logical names do not affect the /DESTINATION qualifier.

/SOURCE=device-name:[directory-name]

Specifies the disk and directory where the utility searches for the software product kit(s). If /SOURCE is not specified, the utility searches in the location defined by the logical name PCSI\$SOURCE. If PCSI\$SOURCE is not defined, and the /SOURCE qualifier is not specified, the POLYCENTER Software Installation utility searches the current default directory.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

Example

```
$ PRODUCT REGISTER PRODUCT TOOLCHEST/SOURCE=DKB500:[TOOLCHEST.KIT]
```

The command in this example registers the product TOOLCHEST that was not installed by the POLYCENTER Software Installation utility, for example, it was installed by the VMSINSTAL utility.

REGISTER VOLUME

For a volume containing installed products, records a change in volume label in the product database. This command also records a change in the physical or logical device name.

Format

PRODUCT REGISTER VOLUME old-volume-label device-name [/qualifiers]

Parameter

old-volume-label

Names the old (existing) volume label.

device-name

Names the device for which the volume label is to be changed in the product database.

Qualifiers

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, /REMOTE can be useful with the CONFIGURE and SHOW commands.

When you use /REMOTE, the following logical names must be defined:

- PCSI\$SYSDEVICE must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.
- PCSI\$SPECIFIC must point to a system root on PCSI\$SYSDEVICE. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE:[SYS*x*]

Note that the definition of PCSI\$SYSDEVICE and PCSI\$SPECIFIC specify only where the utility will find or place its database.

Example

```
$ PRODUCT REGISTER VOLUME AXPVMSV62 DKA0:
```

The command in this example replaces all occurrences of the old volume label in the POLYCENTER Software Installation utility database with the current volume label of the specified disk.

REMOVE

Removes the specified software product or products from your system and the product database.

Format

PRODUCT REMOVE product-name[...] [/qualifiers]

Parameter

product-name

Names the installed product, or list of products, to remove.

Qualifiers

/BASE_SYSTEM=base-system-name

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers.

/REMARK=string

Records a comment in the product database about the task you are performing. The SHOW HISTORY command displays the recorded comments. For each product, the POLYCENTER Software Installation utility stores a chronological list of tasks you perform and the associated remarks. The default behavior is that no remark is recorded.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, /REMOTE can be useful with the CONFIGURE and SHOW commands.

When you use /REMOTE, the following logical names must be defined:

- PCSI\$SYSDEVICE must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.

PRODUCT REMOVE

- **PCSI\$SPECIFIC** must point to a system root on **PCSI\$SYSDEVICE**. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE: [SYS*x*]

Note that the definition of **PCSI\$SYSDEVICE** and **PCSI\$SPECIFIC** specify only where the utility will find or place its database.

/VERSION=version-number

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions.

/WORK=device:[directory]

Specifies the name of the device and directory acting as a temporary work area. By default, temporary files are created in the current working directory.

Example

```
$ PRODUCT REMOVE FTAM
```

The command in this example removes the product named FTAM from the system and the product database.

SHOW HISTORY

Displays a chronological log of operations performed on the specified products.

Format

```
PRODUCT SHOW HISTORY product-name[,...] [/qualifiers]
```

Parameter

product-name

Names the product, or list of products, about which to show information. This is an optional parameter. If you omit it, all products will be shown.

Qualifiers

/BASE_SYSTEM=base-system-name

/BASE_SYSTEM=(base-system-name[,...])

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX. Parentheses (()) are optional only when you specify a single base system name. They are required when you specify multiple base system names.

/BEFORE=time

Selects entries that were created before the specified date and time. You can specify time as an absolute time, as a combination of absolute and delta times, or as one of the following keywords:

TODAY (default)
TOMORROW

YESTERDAY

See the *OpenVMS User's Manual* for information on specifying time values.

/FULL

/NOFULL (default)

Controls how the available information is displayed. The **/FULL** qualifier displays all of the information in 132-column format. The **/NOFULL** qualifier displays a condensed version of the information.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/OPERATION=keyword

Specifies one of the following operations, as the value for keyword:

INSTALL
RECONFIGURE
REGISTER_PRODUCT
REGISTER_VOLUME
REMOVE

/PRODUCER=producer-name

/PRODUCER=(producer-name[,...])

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers. Parentheses (()) are optional only when you specify a single producer name. They are required when you specify multiple producer names.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, **/REMOTE** can be useful with the **CONFIGURE** and **SHOW** commands.

When you use **/REMOTE**, the following logical names must be defined:

- **PCSI\$SYSDEVICE** must point to the target system disk. This disk must be mounted and allocated to the process executing the **PRODUCT** command.
- **PCSI\$SPECIFIC** must point to a system root on **PCSI\$SYSDEVICE**. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE: [SYS*x*]

Note that the definition of **PCSI\$SYSDEVICE** and **PCSI\$SPECIFIC** specify only where the utility will find or place its database. These logical names do not affect the **/DESTINATION**.

/SINCE=time

Selects records that were created after the specified date and time. You can specify time as an absolute time, as a combination of absolute and delta times, or as one of the following keywords:

PRODUCT SHOW HISTORY

TODAY (default)
TOMORROW
YESTERDAY

See the *OpenVMS User's Manual* for information on specifying time values.

/USER=username

/USER=(username[,...])

Displays information about the products installed, configured, or removed by the specified user. Parentheses (()) are optional only when you specify a single user name. They are required when you specify multiple user names.

/VERSION=version-number

/VERSION=(version-number[,...])

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions. Parentheses (()) are optional only when you specify one version number. They are required when you specify more than one version number.

Example

```
$ PRODUCT SHOW HISTORY */OPERATION=INSTALL/BEFORE=22-JUN-1995
```

The command in this example lists all the products that were installed before June 22, 1995.

SHOW OBJECT

Displays information about objects created during a software product installation. Examples of software objects are files and directories.

Format

```
PRODUCT SHOW OBJECT object-name [/qualifiers]
```

Parameter

object-name

Names the object, or list of objects, about which to show information. This is an optional parameter. If you omit it, all objects will be shown.

Qualifiers

/BASE_SYSTEM=base-system-name

/BASE_SYSTEM=(base-system-name[,...])

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX. Parentheses (()) are optional only when you specify a single base system name. They are required when you specify multiple base system names.

/DEVICE=device-name

Specifies a physical device name, a logical device name, or a volume label, and is useful for selecting objects or entries that reside on the specified device.

/DIRECTORY=directory-name

Specifies the location for the files to be selected, and is useful for selecting objects or entries that reside in the specified directory.

/FULL

/NOFULL (default)

Controls how the available information is displayed. The /FULL qualifier displays all of the information in 132-column format. The /NOFULL qualifier displays a condensed version of the information.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/PRODUCER=producer-name

/PRODUCER=(producer-name[,...])

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers. Parentheses (()) are optional only when you specify a single producer name. They are required when you specify multiple producer names.

/PRODUCT=product-name

/PRODUCT=(product-name[,...])

Performs the operation only on the specified product name. Parentheses (()) are optional only when you specify a single product name. They are required when you specify multiple product names.

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, /REMOTE can be useful with the CONFIGURE and SHOW commands.

When you use /REMOTE, the following logical names must be defined:

- PCSI\$SYSDEVICE must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.
- PCSI\$SPECIFIC must point to a system root on PCSI\$SYSDEVICE. It must be defined in the following form where *x* is a valid system root:

PCSI\$SYSDEVICE: [SYS*x*]

Note that the definition of PCSI\$SYSDEVICE and PCSI\$SPECIFIC specify only where the utility will find or place its database. These logical names do not affect the /DESTINATION.

PRODUCT SHOW OBJECT

/VERSION=version-number

/VERSION=(version-number[,...])

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions. Parentheses (()) are optional only when you specify one version number. They are required when you specify more than one version number.

Example

```
$ PRODUCT SHOW OBJECT */PRODUCT=ABC/FULL
```

The command in this example lists all objects such as files, directories, library modules, and other objects that were created when the product ABC was installed.

SHOW PRODUCT

Displays a list of software products installed on your system. Use the /FULL qualifier to display additional information such as kit type, maintenance activity, and software dependencies.

Format

```
PRODUCT SHOW PRODUCT product-name[,...] [/qualifiers]
```

Parameter

product-name

Names the product, or list of products, about which to show information. This is an optional parameter. If you omit it, all products will be shown.

Qualifiers

/BASE_SYSTEM=base-system-name

/BASE_SYSTEM=(base-system-name[,...])

Performs the operation only on software products that apply to the named base system. The default value is the platform (that is, the hardware and software combination) on which the POLYCENTER Software Installation utility is executed. The default is AXPVMS when you run the utility on OpenVMS Alpha and VAXVMS when you run the utility on OpenVMS VAX. Parentheses (()) are optional only when you specify a single base system name. They are required when you specify multiple base system names.

/FULL

/NOFULL (default)

Controls how the available information is displayed. The /FULL qualifier displays all of the information in 132-column format. The /NOFULL qualifier displays a condensed version of the information.

/LOG

/NOLOG (default)

Displays messages as the POLYCENTER Software Installation utility performs the operation.

/MAINTENANCE=product-name

/MAINTENANCE=(product-name[,...])

Displays the products to which the named maintenance products have been applied. A maintenance product is either a patch kit or a mandatory update kit. Parentheses (()) are optional only when you specify a single producer name. They are required when you specify multiple producer names.

To list all maintenance products that have been applied to a particular product, use the following command:

`PRODUCT SHOW PRODUCT product-name /FULL`

/PRODUCER=producer-name

/PRODUCER=(producer-name[,...])

Performs the operation only on software products that are produced by the specified manufacturer. By default, the operation is performed for all producers. Parentheses (()) are optional only when you specify a single producer name. They are required when you specify multiple producer names.

/REFERENCED_BY=product-name

/REFERENCED_BY=(product-name[,...])

Displays products that are referenced by the named product. Use this qualifier to show if the product, specified in the /REFERENCED_BY qualifier, has a software dependency on the product or products specified in the product-name parameter of the SHOW PRODUCT command. If you specify an asterisk (*) as the product name, all referenced products are listed for the product named in the /REFERENCED_BY qualifier.

Parentheses (()) are optional only when you specify a single product name. They are required when you specify multiple product names.

To list all products that depend on a specified product, use the command:

`PRODUCT SHOW PRODUCT product-name /FULL`

/REMOTE

/NOREMOTE (default)

Uses the product database on a system other than the currently running system. This qualifier is primarily for use in command procedures that Digital supplies. Incorrect use of this qualifier can corrupt the POLYCENTER Software Installation utility database, corrupt installed products, or cause other problems. In some cases, /REMOTE can be useful with the CONFIGURE and SHOW commands.

When you use /REMOTE, the following logical names must be defined:

- **PCSI\$SYSDEVICE** must point to the target system disk. This disk must be mounted and allocated to the process executing the PRODUCT command.
- **PCSI\$SPECIFIC** must point to a system root on PCSI\$SYSDEVICE. It must be defined in the following form where *x* is a valid system root:

`PCSI$SYSDEVICE:[SYSx]`

Note that the definition of PCSI\$SYSDEVICE and PCSI\$SPECIFIC specify only where the utility will find or place its database.

PRODUCT SHOW PRODUCT

/VERSION=version-number

/VERSION=(version-number[,...])

Performs the operation only on software products that have the specified version. By default, the operation is performed for all versions. Parentheses (()) are optional only when you specify one version number. They are required when you specify more than one version number.

Example

```
$ PRODUCT SHOW PRODUCT */REFERENCED_BY=DECNET_OSI
```

The command in this example lists all products on which the DECnet OSI product is dependent.

Show Cluster Utility

4

SHAW-GLOSTER UNIT

SHOW CLUSTER Description

The OpenVMS Show Cluster utility (SHOW CLUSTER) monitors nodes in a VMScluster and displays information about cluster-specific activity and performance. SHOW CLUSTER collects information from the System Communications Services (SCS) database, the connection management database, and the port database. The information output by SHOW CLUSTER is categorized into the classes of data shown in Table 4-1.

Table 4-1 Classes of SHOW CLUSTER Information

| Class | Description |
|-------------|--|
| CIRCUITS | Describes information about the virtual circuits on a system, such as the local port name, the remote port type and number, the number of connections on the circuit, and the circuit state. |
| CLUSTER | Displays general VMScluster information, such as the time it was formed, the last time a system joined or left the VMScluster, and the VMScluster quorum. |
| CONNECTIONS | Describes connections established over a virtual circuit, such as the names of the local and remote processes, and the state of the connection. |
| COUNTERS | Displays accumulated statistics on connection traffic, such as the number of application datagrams, and the number of application messages that have been sent or received. |
| CREDITS | Displays the send and receive credits for each connection. |
| ERRORS | Displays a count of errors that have occurred on each port, along with information related to reinitializing those ports. |
| LOCAL_PORTS | Describes the local system interface to the VMScluster, such as the name, number, and status of each port, and the number of entries in the queues associated with each port. |
| MEMBERS | Contains node-specific information, such as each node's identification numbers, quorum status, and connection status. |
| SYSTEMS | Lists information about all systems in the VMScluster, such as the node identification numbers, node names, hardware types, and software versions. |

Each class includes several fields of data. For example, the CIRCUITS class has 11 fields of information, the ERRORS class has 3 fields, the SYSTEMS class includes 10 fields, and so on. The ADD (Field) command in the Command Section contains a complete listing of fields within each class.

You can customize the SHOW CLUSTER display to include the information most important to your needs by dynamically adding and removing classes and fields. For example, if you add a field that belongs to the CLUSTER class or the LOCAL_PORTS class, SHOW CLUSTER adds the new column of information to the display.

By default, the Show Cluster display includes the NODE and SOFTWARE fields of the SYSTEMS class and the STATUS field of the MEMBERS class. Figure 4-1 presents a sample customized SHOW CLUSTER display in which the HW_TYPE, VOTES, and TRANSITION_TIME fields have been added to the default SHOW CLUSTER display.

SHOW CLUSTER Description

Figure 4-1 Sample SHOW CLUSTER Report

View of Cluster from system ID node: METAL 23-JAN-1995 09:53:47

| SYSTEMS | | | MEMBERS | | |
|---------|---------------------|----------|---------|--------|-----------------|
| NODE | HW_TYPE | SOFTWARE | VOTES | STATUS | TRANSITION_TIME |
| METAL | VAX 6000-440 | VMS V6.1 | 1 | MEMBER | 2-DEC-94 17:59 |
| LOYAL | DEC 4000 Model 610 | VMS V6.1 | 1 | MEMBER | |
| HELM | HS70 | HSC V601 | | | |
| CARAT | HS70 | HSC V601 | | | |
| DISK12 | RF72 | RFX V255 | | | |
| SYLVAN | VAX 6000-440 | VMS V6.1 | 1 | MEMBER | 2-DEC-94 18:04 |
| ATHENA | MicroVAX 2000 | VMS V6.1 | 0 | MEMBER | 10-SEP-94 10:04 |
| DISK3 | RF72 | RFX V256 | | | |
| BILLS | VAX 6000-540 | VMS V6.1 | 1 | MEMBER | 2-DEC-94 18:17 |
| CANDYS | VAXstation 3100/GPX | VMS V6.1 | 0 | MEMBER | 2-DEC-94 18:18 |
| CACTUS | VAXstation 3100/SPX | VMS V6.1 | 0 | MEMBER | 26-DEC-94 11:50 |
| METER | VAXstation 4000-VLC | VMS V6.1 | 0 | MEMBER | 2-MAY-94 13:48 |

ZK-5913A-GE

Because SHOW CLUSTER information covers approximately 100 fields of data, the display can quickly extend beyond screen limits. Therefore, the utility provides mechanisms to help you control the display of data. These mechanisms include the following:

- SHOW CLUSTER qualifiers
- SHOW CLUSTER commands
- A default keypad, which can be redefined
- An initialization file to format the display
- Command procedures to control the display

SHOW CLUSTER has 5 qualifiers, 38 commands, and a definable keypad that allow you to customize the display. You can rearrange the position of windows, scroll their contents, or change the interval at which the display is updated. This chapter contains reference information for the SHOW CLUSTER qualifiers and commands. Appendix B describes how to use the keypad.

Over time, as you determine the most valuable classes and fields of data for the SHOW CLUSTER report, you can create a startup initialization file that establishes your default report format. You can also build command procedures to use while running SHOW CLUSTER interactively. In this way, you can quickly reformat the display to show the data that is relevant for your installation. The *OpenVMS System Manager's Manual* describes how to use the initialization files and command procedures to get the most from the Show Cluster utility.

SHOW CLUSTER Usage Summary

The Show Cluster utility (SHOW CLUSTER) monitors the activity and performance of a VMScluster system, and outputs the information to your default terminal or to a specified device or file.

Format

SHOW CLUSTER [/qualifier[, ...]]

Parameters

None.

Usage Summary

To invoke SHOW CLUSTER, enter the following command:

```
$ SHOW CLUSTER
```

If you specify the command without any qualifiers, SHOW CLUSTER displays a single cluster report and then returns control to the DCL level. To invoke a continuous SHOW CLUSTER display, enter the following command:

```
$ SHOW CLUSTER/CONTINUOUS
```

In a continuous display, you can control report output with SHOW CLUSTER commands. You can direct SHOW CLUSTER output to a file or device other than to SYS\$OUTPUT by specifying the /OUTPUT qualifier with the SHOW CLUSTER command.

To exit from a continuous display and return to the DCL level, enter the EXIT command or press Ctrl/Z. To exit from SHOW CLUSTER without erasing the screen, press Ctrl/C. To interrupt SHOW CLUSTER, press Ctrl/Y.

SHOW CLUSTER

SHOW CLUSTER Qualifiers

This section describes and provides examples of the SHOW CLUSTER qualifiers. Table 4-2 describes the qualifiers.

Table 4-2 SHOW CLUSTER Qualifiers

| Qualifier | Description |
|-------------------|---|
| /BEGINNING=time | Specifies the time that the SHOW CLUSTER session is to begin. |
| /CONTINUOUS | Controls whether SHOW CLUSTER runs as a continuously updating display. |
| /ENDING=time | Specifies the time that the SHOW CLUSTER session is to end. |
| /INTERVAL=seconds | Specifies the number of seconds that display information remains on the screen before it is updated. |
| /OUTPUT=file-spec | Directs the output from SHOW CLUSTER to the specified file instead of the current SYS\$OUTPUT device. |

/BEGINNING=time

Specifies the time that the SHOW CLUSTER session is to begin. You can specify an absolute time, a delta time, or a combination of the two. Observe the syntax rules for time values described in the *OpenVMS User's Manual*.

If you specify a future time, your process is placed in a state of hibernation until the specified time. Use this qualifier with the /OUTPUT and /ENDING qualifiers to run SHOW CLUSTER without direct user intervention.

Format

/BEGINNING=time

Parameter

time

You can specify time as an absolute time expressed as [dd-mmm-yyyy[:]] [hh:mm:ss.cc], or a delta time expressed as [dddd-][hh:mm:ss.cc], or a combination of the two. Observe the syntax rules for time values described in the *OpenVMS User's Manual*.

Examples

1. \$ SHOW CLUSTER/BEGINNING=31-DEC-1994:20:30

In this example, specifying an absolute time, SHOW CLUSTER produces a single display at 8:30 P.M. on December 31, 1994.

2. \$ SHOW CLUSTER/CONTINUOUS/BEGINNING=31-DEC-1994:21:30

In this example, specifying an absolute time, SHOW CLUSTER begins a continuous display at 9:30 P.M. on December 31, 1994.

3. \$ SHOW CLUSTER/BEGINNING=7-:30

In this example, specifying a delta time, SHOW CLUSTER produces a single display 7 days and 30 minutes from now.

/CONTINUOUS

Controls whether SHOW CLUSTER runs as a continuously updating display. If you omit the qualifier, SHOW CLUSTER produces a single display and returns control to the DCL command level.

Running SHOW CLUSTER in the continuous mode allows you to use SHOW CLUSTER commands to control the display.

Format

/CONTINUOUS

Example

\$ SHOW CLUSTER/CONTINUOUS

In this example, SHOW CLUSTER begins to display a continuous report that is updated every 15 seconds.

/ENDING=time

Specifies the time that the SHOW CLUSTER session is to end. You can specify an absolute time, a delta time, or a combination of the two. Observe the syntax rules for time values described in the *OpenVMS User's Manual*.

Use this qualifier with the /BEGINNING and /OUTPUT qualifiers to run SHOW CLUSTER without direct user intervention.

Format

/ENDING=time

Parameter

time

You can specify time as an absolute time expressed as [dd-mmm-yyyy[:]][hh:mm:ss.cc], or a delta time expressed as [dddd-][hh:mm:s.cc], or a combination of the two. Observe the syntax rules for time values described in the *OpenVMS User's Manual*.

Example

\$ SHOW CLUSTER/CONTINUOUS/ENDING=31-DEC-1994:15:30

In this example, SHOW CLUSTER begins a continuous display now and ends the display at 3:30 P.M. on December 31, 1994.

SHOW CLUSTER **/INTERVAL=seconds**

/INTERVAL=seconds

Specifies the number of seconds that display information remains on the screen before it is updated. By default, the interval time is 15 seconds.

Format

/INTERVAL=seconds

Parameter

seconds

The number of seconds between display updates.

Example

```
$ SHOW CLUSTER/INTERVAL=5
```

In this example, **SHOW CLUSTER** displays a continuous report that is updated every 5 seconds.

/OUTPUT=file-spec

Directs the output from **SHOW CLUSTER** to the specified file instead of the current **SYS\$OUTPUT** device.

SHOW CLUSTER output is always in printable file format, regardless of the file or device type specified. Output can be up to 132 columns wide and can be sent to any file, terminal, or print device.

You can also direct output to a file with the **WRITE** command.

Format

/OUTPUT=file-spec

Parameter

file-spec

The name of the file or device to which **SHOW CLUSTER** output is directed. The default file name is **SHOW_CLUSTER.LIS**.

You can direct output to a device other than **SYS\$OUTPUT** by specifying a valid device name.

Example

```
$ SHOW CLUSTER/OUTPUT=[OMALLEY]CLUSTER
```

In this example, **SHOW CLUSTER** produces one report and directs it to the file **CLUSTER.LIS;1** in the directory **OMALLEY**.

SHOW CLUSTER Commands

Once you start a continuous SHOW CLUSTER display session, you can use SHOW CLUSTER commands to control the session. Table 4-3 describes each command.

Table 4-3 SHOW CLUSTER Command Summary

| Command Name | Description |
|-----------------------|---|
| @ (Execute Procedure) | Executes a command procedure file that contains SHOW CLUSTER commands. |
| ADD CIRCUITS | Adds all currently enabled CIRCUITS class fields to the SHOW CLUSTER display. |
| ADD CLUSTER | Adds all currently enabled CLUSTER class fields to the SHOW CLUSTER display. |
| ADD CONNECTIONS | Adds all currently enabled CONNECTIONS class fields to the SHOW CLUSTER display. Optionally, the command adds connections according to state or name. |
| ADD COUNTERS | Adds all currently enabled COUNTERS class fields to the SHOW CLUSTER display. |
| ADD CREDITS | Adds all currently enabled CREDITS class fields to the SHOW CLUSTER display. |
| ADD ERRORS | Adds all currently enabled ERRORS class fields to the SHOW CLUSTER display. |
| ADD (Field) | Enables the display of specific fields of SHOW CLUSTER information. |
| ADD LOCAL_PORTS | Adds all currently enabled LOCAL_PORTS class fields to the SHOW CLUSTERS display. |
| ADD MEMBERS | Adds all currently enabled MEMBERS class fields to the SHOW CLUSTER display. |
| ADD SYSTEMS | Adds all currently enabled SYSTEMS class fields to the SHOW CLUSTER display for all active systems or for selected systems. |
| DEFINE/KEY | Associates an equivalence string and set of attributes with a key on the terminal keyboard. |
| DESELECT | Terminates the selection of a previously selected window. |
| EXIT | Terminates the SHOW CLUSTER display and returns control to the DCL command level. |
| HELP | Provides online help information for using SHOW CLUSTER commands, parameters, and qualifiers. Press Ctrl/Z to exit. |
| INITIALIZE | Resets the display using the original default values for field names, class names, and field widths. It also restores any systems that were removed from the display by the REMOVE SYSTEMS command. |
| MOVE | Moves a selected window to a specified position. |
| PAN | Exhibits a wide display area, a part at a time, as though being unrolled. |

(continued on next page)

SHOW CLUSTER

Table 4-3 (Cont.) SHOW CLUSTER Command Summary

| Command Name | Description |
|----------------------|---|
| REFRESH | Clears the screen, removes extraneous characters, and updates all fields. |
| REMOVE CIRCUITS | Removes CIRCUITS class information from the SHOW CLUSTER display. |
| REMOVE CLUSTER | Removes CLUSTER class information from the SHOW CLUSTER display. |
| REMOVE CONNECTIONS | Removes CONNECTIONS class information from the SHOW CLUSTER display. |
| REMOVE COUNTERS | Removes COUNTERS class information from the SHOW CLUSTER display. |
| REMOVE CREDITS | Removes CREDITS class information from the SHOW CLUSTER display. |
| REMOVE ERRORS | Removes ERRORS class information from the SHOW CLUSTER display. |
| REMOVE (Field) | Disables the display of specific fields of SHOW CLUSTER information. |
| REMOVE LOCAL_PORTS | Removes LOCAL_PORTS class information from the SHOW CLUSTER display. |
| REMOVE MEMBERS | Removes MEMBERS class information from the SHOW CLUSTER display. |
| REMOVE SYSTEMS | Removes SYSTEMS class information from the SHOW CLUSTER display. |
| SAVE | Allows you to build a startup initialization file or a command procedure that creates the current display so you can restore the display at a later time. |
| SCROLL | Scrolls a window. |
| SELECT | Designates which window to scroll or move. |
| SET AUTO_POSITIONING | Enables or disables the automatic positioning of windows within a display. |
| SET (Field) | Modifies the characteristics of particular fields within the display. |
| SET FUNCTION | Enables one of the following SHOW CLUSTER functions: EDIT, MOVE, PAN, or SCROLL. |
| SET INTERVAL | Changes the interval time between display updates. The default interval time is 15 seconds. |
| SET SCREEN | Sets the terminal to a display of up to 511 columns. |
| WRITE | Outputs the current display to a file that can be printed on a hardcopy device. |

@ (Execute Procedure)

Executes a command procedure file that contains SHOW CLUSTER commands.

Format

@ file-spec

Parameter

file-spec

Specifies the name of the file that contains the commands to be executed. If you omit the file type, the default file type .COM is used. No wildcard characters are allowed in the file specification.

Qualifiers

None.

Description

The execute procedure (@) command allows you to execute a set of SHOW CLUSTER commands that is contained in a file. For example, a command procedure file might contain a set of commands to customize a SHOW CLUSTER display. You can use any valid SHOW CLUSTER commands in the command procedure.

You can nest command procedures up to 16 levels deep.

SHOW CLUSTER looks for the command procedure in the directory specified by the logical name SHOW_CLUSTER\$INIT. If SHOW_CLUSTER\$INIT is not defined or does not include a directory specification, the utility looks for the command procedure in the current default directory.

Example

```
COMMAND> @MYFILE
```

The command in this example executes the command procedure MYFILE.COM. Because no file type is specified, the file type defaults to .COM.

ADD CIRCUITS

Adds all currently enabled CIRCUITS class fields to the SHOW CLUSTER display. The CIRCUITS class contains information about the virtual circuits on systems in the cluster.

Format

ADD CIRCUITS [/qualifier[, . . .]]

SHOW CLUSTER ADD CIRCUITS

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display.

/TYPE=ALL

Specifies that all types of circuits be included in the display, including formative, open, and closing circuits.

/TYPE=OPEN

/TYPE=NOOPEN

Controls whether either open circuits or nonopen circuits are added to the display.

Description

The ADD CIRCUITS command adds CIRCUITS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the CIRCUITS class. By default, the RPORT_NUM (remote port number), RP_TYPE (remote port type), and CIR_STATE (circuit state) fields are enabled. For a list of valid CIRCUITS class fields, see the ADD (Field) command.

You use the ADD CIRCUITS command together with the REMOVE CIRCUITS command to turn the display of CIRCUITS class information on and off. If you remove the CIRCUITS class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the CIRCUITS class and add new CIRCUITS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. **COMMAND> ADD CIRCUITS**

The ADD CIRCUITS command in this example adds CIRCUITS class information to the display. This information includes all types of circuits for all enabled CIRCUITS class fields.

2. **COMMAND> ADD CIRCUITS/TYPE=OPEN**

The ADD CIRCUITS command in this example adds all open circuits to the SHOW CLUSTER display.

3. **COMMAND> REMOVE CIRCUITS**
COMMAND> ADD RP_OWNER
COMMAND> REMOVE CIRCUITS

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COMMAND> ADD CIRCUITS

The ADD CIRCUITS command in this example sequence adds CIRCUITS class information to the SHOW CLUSTER display. The REMOVE CIRCUITS command removes the CIRCUITS class from the display. The ADD RP_OWNER command adds the CIRCUITS class field RP_OWNER to the display. As a result, all other CIRCUITS class fields are disabled. When the

CIRCUITS class is removed and added again, only the RP_OWNER field is displayed.

ADD CLUSTER

Adds all currently enabled CLUSTER class fields to the SHOW CLUSTER display.

Format

ADD CLUSTER

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display.

Description

The ADD CLUSTER command adds CLUSTER class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the CLUSTER class. By default, the CLUSTER class includes CL_EXPECTED_VOTES (number of cluster votes expected), CL_QUORUM (cluster quorum), CL_VOTES (cluster votes), QF_VOTE (quorum disk contributes a vote), CL_MEMBERS (current cluster members), FORMED (when quorum was formed), and LAST_TRANSITION (last change in cluster membership). For a list of valid CLUSTER class fields, see the ADD (Field) command.

You use the ADD CLUSTER command with the REMOVE CLUSTER command to turn the display of CLUSTER class information on and off. If you remove the CLUSTER class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the CLUSTER class and add new CLUSTER class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. COMMAND> ADD CLUSTER

The ADD CLUSTER command in this example adds CLUSTER class information to the display. This information includes all enabled CLUSTER class fields.

2. COMMAND> REMOVE CLUSTER
COMMAND> ADD CL_QUORUM
COMMAND> REMOVE CLUSTER

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COMMAND> ADD CLUSTER

The ADD CLUSTER command in this example adds CLUSTER class information to the SHOW CLUSTER display. The first command in

SHOW CLUSTER ADD CLUSTER

the sequence removes the CLUSTER class from the display. The second command, ADD CL_QUORUM, adds the CLUSTER class field CL_QUORUM to the display. As a result, all other CLUSTER class fields are disabled. When the CLUSTER class is removed and added again, only the CL_QUORUM field is displayed.

ADD CONNECTIONS

Adds all currently enabled CONNECTIONS class fields to the SHOW CLUSTER display. Optionally, the command adds connections according to state or name.

Format

ADD CONNECTIONS [/qualifier[, ...]]

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display.

/NAME=ALL

Restores processes removed from the display with the command REMOVE CONNECTIONS/NAME=local-process-name.

/NAME=local-process-name

Adds the connection associated with the specified local process name, as displayed in the LOC_PROC_NAME field of the CONNECTIONS class.

A local process name can contain up to 16 characters. If the name is abbreviated, SHOW CLUSTER adds all local process names matching the abbreviation.

/TYPE=ALL

Specifies that all types of connections on each circuit are displayed. For a listing of the possible states a connection can be in, see the description of the CON_STATE field in the ADD (Field) command. By default, the ADD CONNECTIONS command without any qualifiers displays all types of connections.

/TYPE=OPEN

/TYPE=NOOPEN

Controls whether connections in the open state or the nonopen state are added to the SHOW CLUSTER display.

Description

The ADD CONNECTIONS command adds CONNECTIONS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the CONNECTIONS class. By default, the LOC_PROC_NAME (local process name) and CON_STATE (connection state) fields are enabled. For a list of valid CONNECTIONS class fields, see the ADD (Field) command.

Use the ADD CONNECTIONS command together with the REMOVE CONNECTIONS command to turn the display of CONNECTIONS class information on and off. If you remove the CONNECTIONS class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the CONNECTIONS class and add new CONNECTIONS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. `COMMAND> ADD CONNECTIONS`

The ADD CONNECTIONS command in this example adds CONNECTIONS class information to the display. This information includes all enabled CONNECTIONS class fields.

2. `COMMAND> ADD CONNECTIONS/NAME=(MSCP$DISK,VMS$VMScluster)`

The ADD CONNECTIONS command in this example adds all connections associated with the process MSCP\$DISK and the process VMS\$VMScluster to the SHOW CLUSTER display.

3. `COMMAND> ADD CONNECTIONS/TYPE=OPEN`

The command in this example adds all open connections to the SHOW CLUSTER display.

4. `COMMAND> REMOVE CONNECTIONS`
`COMMAND> ADD SCS_STATE`
`COMMAND> REMOVE CONNECTIONS`

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`COMMAND> ADD CONNECTIONS`

The ADD CONNECTIONS command in this example adds CONNECTIONS class information to the SHOW CLUSTER display. The first command in the sequence removes the CONNECTIONS class from the display. The second command, ADD SCS_STATE, adds the CONNECTIONS class field SCS_STATE to the display. As a result, all other CONNECTIONS class fields are disabled. When the CONNECTIONS class is removed and added again, only the SCS_STATE field is displayed.

ADD COUNTERS

Adds all currently enabled COUNTERS class fields to the SHOW CLUSTER display.

Format

`ADD COUNTERS`

SHOW CLUSTER ADD COUNTERS

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display.

Description

The ADD COUNTERS command adds COUNTERS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the COUNTERS class. By default, the DGS_SENT (datagrams sent), DGS_RCVD (datagrams received), MSGS_SENT (messages sent), and MSGS_RCVD (messages received) fields are enabled. For a list of valid COUNTERS class fields, see the ADD (Field) command.

Use the ADD COUNTERS command together with the REMOVE COUNTERS command to turn the display of COUNTERS class information on and off. If you remove the COUNTERS class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the COUNTERS class and add new COUNTERS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. `COMMAND> ADD COUNTERS`

The ADD COUNTERS command in this example adds COUNTERS class information to the display. This information includes all enabled COUNTERS class fields.

2. `COMMAND> REMOVE COUNTERS`
`COMMAND> ADD MSGS_SENT`
`COMMAND> REMOVE COUNTERS`

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`COMMAND> ADD COUNTERS`

The ADD COUNTERS command in this example sequence adds COUNTERS class information to the SHOW CLUSTER display. The first command removes the COUNTERS class from the display. The second command, ADD MSGS_SENT, adds the COUNTERS class field MSGS_SENT to the display. As a result, all other COUNTERS class fields are disabled. When the COUNTERS class is removed and added again, only the MSGS_SENT field is displayed.

ADD CREDITS

Adds all currently enabled CREDITS class fields to the SHOW CLUSTER display.

Format

ADD CREDITS

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display. By default, the ADD CREDITS command, used without any qualifiers, displays all the CREDITS class fields.

Description

The ADD CREDITS command adds CREDITS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the CREDITS class. By default, all CREDITS class fields are enabled. For a list of valid CREDITS class fields, see the ADD (Field) command.

Use the ADD CREDITS command together with the REMOVE CREDITS command to turn the display of CREDITS class information on and off. If you remove the CREDITS class from the display and then add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the CREDITS class and add new CREDITS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. `COMMAND> ADD CREDITS`

The ADD CREDITS command in this example adds CREDITS class information to the display. This information includes all enabled CREDITS class fields.

2. `COMMAND> REMOVE CREDITS`
`COMMAND> ADD MIN_REC`
`COMMAND> REMOVE CREDITS`

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`COMMAND> ADD CREDITS`

The ADD CREDITS command in this example sequence adds CREDITS class information to the SHOW CLUSTER display. The first command removes the CREDITS class from the display. The second command, ADD MIN_REC, adds the CREDITS class field MIN_REC to the display. As a result, all other CREDITS class fields are disabled. When the CREDITS class is removed and added again, only the MIN_REC field is displayed.

SHOW CLUSTER ADD ERRORS

ADD ERRORS

Adds all currently enabled ERRORS class fields to the SHOW CLUSTER display.

Format

ADD ERRORS

Parameters

None.

Qualifiers

/ALL

Specifies that all fields in this class be added to the display. By default, ADD ERRORS, used without any field qualifiers, displays all the fields in the ERRORS class.

Description

The ADD ERRORS command adds ERRORS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the ERRORS class. By default, all ERRORS class fields are enabled. For a list of valid ERRORS class fields, see the ADD (Field) command.

Use the ADD ERRORS command together with the REMOVE ERRORS command to turn the display of ERRORS class information on and off. If you remove the ERRORS class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the ERRORS class and add new ERRORS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. COMMAND> ADD ERRORS

The ADD ERRORS command in this example adds ERRORS class information to the display. This information includes all enabled ERRORS class fields.

2. COMMAND> REMOVE ERRORS
COMMAND> ADD ERT_MAX
COMMAND> REMOVE ERRORS

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COMMAND> ADD ERRORS

The ADD ERRORS command in this example sequence adds ERRORS class information to the SHOW CLUSTER display. The first command removes the ERRORS class from the display. The second command, ADD ERT_MAX, adds the ERRORS class field ERT_MAX to the display. As a result, all other ERRORS class fields are disabled. When the ERRORS class is removed and added again, only the ERT_MAX field is displayed.

ADD (Field)

Enables the display of specific fields of SHOW CLUSTER information.

Format

ADD field-name[, ...]

Parameters

field-name

Specifies one or more of the following fields of information to be added to the display of a particular class.

CIRCUITS Class

The CIRCUITS class contains information about the virtual circuits on a system, such as the local port name, the remote port type and number, the number of connections on the circuit, and the circuit state.

| Field Name | Description |
|-----------------|---|
| CABLE_STATUS | Status of the circuit paths A and B. Crossed cables are also noted. The field applies only to the CI. Possible displays are as follows: - Paths A and B are bad. A- Path A is good. -B Path B is good. A-B Paths A and B are good. CROSSED Cables are crossed. |
| CIR_STATE | State of the virtual circuit. Possible displays are as follows: CLOSED Circuit is closed. OPEN Circuit is open. ST_REC Circuit has a start received. ST_SENT Circuit has a start sent. VC_FAIL Virtual circuit failure is in progress. |
| LPORT_NAME | Device name of the local port associated with the circuit (PAA0, PAB0, PEA0). |
| NUM_CONNECTIONS | Number of connections on the circuit between the local and remote systems. |

SHOW CLUSTER ADD (Field)

| Field Name | Description |
|--------------|--|
| REM_STATE | State of the remote port. Possible displays are as follows: DISAB Remote port is disabled. ENAB Remote port is enabled. M_DISAB Remote port is in maintenance mode and is disabled. M_ENAB Remote port is in maintenance mode and is enabled. M_UNINIT Remote port is in maintenance mode and has not been initialized. UNINIT Remote port has not been initialized. |
| RP_FUNCTIONS | Function mask of the remote port. |
| RPORT_NUM | Port number of the remote port associated with the circuit. The field applies only to CI. |
| RP_OWNER | Port number of the remote port owner. |
| RP_REVISION | Hardware or microcode revision number of the remote port. |
| RP_TYPE | Type of remote port associated with the circuit. Examples of some possible types might include: CIMNA, KFMSA, SHAC, SII, BVPSSP (a BVP storage systems port), CI780, CI750, CIBCA-A and CIBCA-B, RF and TF devices (for example RF73 or TF85), HSC devices (for example, HSC65 or HSC90), Ethernet, PASSTH (port is in passthrough mode), and so on. |
| SCS_WAITERS | Number of connections waiting to send SCS control messages on the virtual circuit. |

CLUSTER Class

The CLUSTER class contains general information about the cluster, such as the time it was formed, the last time a system joined or left the cluster, and the cluster quorum.

| Field Name | Description |
|-------------------|---|
| CL_EXPECTED_VOTES | The number of votes the cluster has ever seen – or could see, as determined by the connection manager. The value is based on the maximum value of CL_EXPECTED_VOTES, the value for EXPECTED_VOTES that is specified by each node, and the sum of the cluster votes (CL_VOTES). CL_QUORUM is derived from CL_EXPECTED_VOTES. |
| CL_MEMBERS | Number of processors participating in the cluster. |
| CL_QDVOTES | Number of votes contributed by the quorum disk. |

| Field Name | Description |
|-----------------|--|
| CL_QUORUM | The number of votes that must be present for the cluster to function and permit user activity. CL_QUORUM is equal to (CL_EXPECTED_VOTES + 2) divided by 2. |
| CL_VOTES | Total number of votes contributed by all members of the cluster at any point in time. |
| FORMED | Time at which the cluster was formed, expressed as dd-mmm-yy hh:mm. |
| LAST_TRANSITION | Last time at which a system left or joined the cluster, expressed as dd-mmm-yy hh:mm. |
| MEMSEQ | Membership state sequence number, which changes whenever a node joins or leaves the cluster. |
| QD_NAME | Full device name of the quorum disk. |
| QF_VOTE | Indicates whether or not the quorum disk is contributing any votes towards the cluster quorum. |

CONNECTIONS Class

The CONNECTIONS class contains information about connections established over a virtual circuit, such as the names of the local and remote processes, and the state of the connection.

| Field Name | Description |
|---------------|--|
| CON_STATE | The state of the connection. Possible displays are as follows: |
| ACCP_SENT | Accept request has been sent. |
| CLOSED | Connection is closed. |
| CON_ACK | Connect request has been sent and acknowledged. |
| CON_REC | Connect request has been received. |
| CON_SENT | Connect request has been sent. |
| DISC_ACK | Disconnect request is acknowledged. |
| DISC_MTCH | Disconnect request is matched. |
| DISC_REC | Disconnect request has been received. |
| DISC_SENT | Disconnect request has been sent. |
| LISTEN | Connection is in the listen state. |
| OPEN | Connection is open. |
| REJ_SENT | Reject has been sent. |
| VC_FAIL | Virtual circuit has failed. |
| LOC_CONID | Identification number of the local side of the connection. |
| LOC_PROC_NAME | Name of the local process associated with the connection. |
| REM_CONID | Identification number of the remote side of the connection. This information does not apply for connections in the listen state. |

SHOW CLUSTER ADD (Field)

| Field Name | Description |
|---------------|---|
| REM_PROC_NAME | Name of the remote process associated with the connection. This information does not apply for connections in the listen state. |
| SCS_STATE | SCS send blocked state. If the connection is waiting to send an SCS control block message, the SCS send blocked state indicates what kind of message it is waiting to send. Possible displays are as follows: |
| ACCP_PEND | Waiting to send an accept request. |
| CLEAR | Not blocked. |
| CON_PEND | Waiting to send a connection request. |
| CR_PEND | Waiting to send credit. |
| DCR_PEND | Waiting to send credit in preparation for a disconnect. |
| DISC_PEND | Waiting to send a disconnect request. |
| REJ_PEND | Waiting to send a reject request. |

COUNTERS Class

The COUNTERS class displays statistics on connection traffic, such as the number of application datagrams or the number of application messages that have been sent or received.

| Field Name | Description |
|------------|---|
| BDT_WAITS | Number of times this connection had to wait for a buffer descriptor. |
| BLKS_REQ | Number of block-request data commands initiated to block transfer data from the remote system to the local system. |
| BLKS_SENT | Number of block-send data commands initiated to block-transfer data from the local system to the remote system. |
| CR_WAITS | Number of times this connection had to wait for send credit. |
| DGS_DSCRD | Number of application datagrams discarded by the port driver. |
| DGS_RCVD | Number of application datagrams received by the local system over the connection from the remote system and given to SYSAP. |
| DGS_SENT | Number of application datagrams sent over the connection. |
| KB_MAPPED | Number of kilobytes of data mapped for block transfer. |

| Field Name | Description |
|------------|--|
| KB_RCVD | Number of kilobytes of data received by the local system from the remote system through request-data commands. |
| KB_SENT | Number of kilobytes of data sent from the local system to the remote system through send-data commands. |
| MSGS_RCVD | Number of application datagram messages received over the connection. |
| MSGS_SENT | Number of application datagram messages sent over the connection. |

CREDITS Class

The CREDITS class displays the send and receive credit counts for each connection.

| Field Name | Description |
|------------|--|
| INIT_REC | Initial receive credit extended to the remote system when the connection was made. |
| MIN_REC | Minimum receive credit (minimum send credit required by the remote system). |
| MIN_SEND | Minimum send credit. |
| PEND_REC | Receive credit not yet extended to the remote system. |
| RECEIVE | Receive credit (send credit held by the remote system). |
| SEND | Current send credit. |

ERRORS Class

The ERRORS class displays a count of the errors on each port, along with information on the feasibility of reinitializing a port.

| Field Name | Description |
|------------|---|
| ERT_COUNT | Number of port reinitialization attempts remaining. |
| ERT_MAX | Total number of times a recovery from fatal port errors can be attempted by shutting down all virtual circuits and connections and reinitializing the port. |
| NUM_ERRORS | Number of errors that have been logged on the port since the system was booted. This number includes errors encountered in reinitialization attempts as well as recoverable errors, such as virtual circuit failure. This is the same error count as that displayed by the DCL command SHOW DEVICE. |

LOCAL_PORTS Class

The LOCAL_PORTS class displays information on the local system interface to the cluster, such as the name, number, and status of each port, and the number of entries in the queues associated with each port.

SHOW CLUSTER ADD (Field)

| Field Name | Description | | | | | | | | | | |
|---------------|--|-----|---------------------------------------|----|--------------------------------|----|--------------------------------|---|---|-----|------------------------------------|
| BUFF_DESCR | Number of buffer descriptors in use. | | | | | | | | | | |
| CMDS_QUEUED | Total number of messages, datagrams, and port commands queued for transmission at all priorities by the port. | | | | | | | | | | |
| COUNTER_OWNER | Name of the process currently using the port traffic counters. | | | | | | | | | | |
| DGI_MAP | A 16-bit bit map displayed as four hexadecimal digits. Each bit in the map represents a port in the cluster from which datagram reception has been disabled. | | | | | | | | | | |
| DG_OVRHD_SIZE | Number of bytes of port header, SCS header, and DECnet header in a datagram. | | | | | | | | | | |
| DGS_FREE | Number of free datagram buffers currently queued for receive commands. | | | | | | | | | | |
| FORM_CIRCS | Number of formative circuits (circuits in the process of opening) from the port. | | | | | | | | | | |
| FREE_BUFF | Number of CI buffer descriptors free for use. | | | | | | | | | | |
| LB_STATUS | <p>Loopback status of each cable from the port to the star coupler. The field applies only to CI. Possible displays are as follows:</p> <table> <tr> <td>A-B</td><td>Loopback tests pass on paths A and B.</td></tr> <tr> <td>A-</td><td>Loopback tests pass on path A.</td></tr> <tr> <td>-B</td><td>Loopback tests pass on path B.</td></tr> <tr> <td>-</td><td>Loopback tests failed on paths A and B.</td></tr> <tr> <td>N/A</td><td>Loopback tests are not being done.</td></tr> </table> | A-B | Loopback tests pass on paths A and B. | A- | Loopback tests pass on path A. | -B | Loopback tests pass on path B. | - | Loopback tests failed on paths A and B. | N/A | Loopback tests are not being done. |
| A-B | Loopback tests pass on paths A and B. | | | | | | | | | | |
| A- | Loopback tests pass on path A. | | | | | | | | | | |
| -B | Loopback tests pass on path B. | | | | | | | | | | |
| - | Loopback tests failed on paths A and B. | | | | | | | | | | |
| N/A | Loopback tests are not being done. | | | | | | | | | | |
| LOG_MAP | A 16-bit bit map displayed as four hexadecimal digits. Each bit in the map represents a port in the cluster for which an error was logged. Errors are logged when data provided by the configuration database on the local system conflicts with data provided by the remote system. When a conflict is discovered and an error is logged, virtual circuits to the remote system can no longer be established. | | | | | | | | | | |
| LP_STATUS | Status of the local port. The port is either on line or off line. | | | | | | | | | | |
| LP_TYPE | Device type of the port (CI780, CI750). | | | | | | | | | | |
| MAX_PORT | Largest port number to which a virtual circuit open is attempted. | | | | | | | | | | |
| MSG_FREE | Number of free message buffers currently queued for receives commands. | | | | | | | | | | |
| MSG_HDR_SIZE | Number of bytes of port header and SCS header in a message. | | | | | | | | | | |
| NAME | Device name of the local port. | | | | | | | | | | |

| Field Name | Description |
|--------------|---|
| OPEN_CIRCS | Number of virtual circuits open from the port. |
| POOL_WAITERS | Number of processes waiting for nonpaged pool resources for message buffers. |
| PORT_NUM | Port number assigned to the port. |
| PRT_MAP | A 16-bit bit map displayed as three hexadecimal digits. Each bit in the map represents a port in the cluster that has been recognized by the host system. |
| RSPS_QUEUED | Total number of responses of all kinds received from the port but not yet processed. |

MEMBERS Class

The MEMBERS class contains information about active systems in the cluster, such as their identification numbers and membership status.

| Field Name | Description | | | | | | | | | | | | | | | | | | | | |
|----------------|--|--------|---------------------------------|--------|-----------------------|---------|---------------------------------------|------|----------------------------|------------|-------------------------------|-----|--|------|---------------------|----------|--|-----------|--|------|-------------------------|
| ACK_LM | Maximum number of VMSccluster messages the remote system can receive before sending an acknowledgment. | | | | | | | | | | | | | | | | | | | | |
| ACKR_SQ | Sequence number of the last acknowledgment received over the VMSccluster connection. | | | | | | | | | | | | | | | | | | | | |
| CNX_STATE | State of the VMSccluster connection. Possible displays are as follows: <table> <tr> <td>ACCEPT</td><td>Initial connection is accepted.</td></tr> <tr> <td>CLOSED</td><td>Connection is closed.</td></tr> <tr> <td>CONNECT</td><td>Initial connection is being accepted.</td></tr> <tr> <td>DEAD</td><td>No connection is possible.</td></tr> <tr> <td>DISCONNECT</td><td>Disconnection is in progress.</td></tr> <tr> <td>NEW</td><td>No attempt to make a connection has been made yet.</td></tr> <tr> <td>OPEN</td><td>Connection is open.</td></tr> <tr> <td>REACCEPT</td><td>Connection is accepting the reconnect request.</td></tr> <tr> <td>RECONNECT</td><td>Connection is attempting to reconnect.</td></tr> <tr> <td>WAIT</td><td>Timeout is in progress.</td></tr> </table> | ACCEPT | Initial connection is accepted. | CLOSED | Connection is closed. | CONNECT | Initial connection is being accepted. | DEAD | No connection is possible. | DISCONNECT | Disconnection is in progress. | NEW | No attempt to make a connection has been made yet. | OPEN | Connection is open. | REACCEPT | Connection is accepting the reconnect request. | RECONNECT | Connection is attempting to reconnect. | WAIT | Timeout is in progress. |
| ACCEPT | Initial connection is accepted. | | | | | | | | | | | | | | | | | | | | |
| CLOSED | Connection is closed. | | | | | | | | | | | | | | | | | | | | |
| CONNECT | Initial connection is being accepted. | | | | | | | | | | | | | | | | | | | | |
| DEAD | No connection is possible. | | | | | | | | | | | | | | | | | | | | |
| DISCONNECT | Disconnection is in progress. | | | | | | | | | | | | | | | | | | | | |
| NEW | No attempt to make a connection has been made yet. | | | | | | | | | | | | | | | | | | | | |
| OPEN | Connection is open. | | | | | | | | | | | | | | | | | | | | |
| REACCEPT | Connection is accepting the reconnect request. | | | | | | | | | | | | | | | | | | | | |
| RECONNECT | Connection is attempting to reconnect. | | | | | | | | | | | | | | | | | | | | |
| WAIT | Timeout is in progress. | | | | | | | | | | | | | | | | | | | | |
| CSID | Cluster system identification number. This number is unique over the life of the cluster. Unlike SYS_ID, this identification number may change when the system reboots. | | | | | | | | | | | | | | | | | | | | |
| DIR_WT | Lock manager distributed directory weight. | | | | | | | | | | | | | | | | | | | | |
| EXPECTED_VOTES | Maximum number of votes that an individual node ever encounters. Used as an initial estimate for computing CL_EXPECTED_VOTES. The cluster manager sets this number using the system parameter EXPECTED_VOTES. | | | | | | | | | | | | | | | | | | | | |

SHOW CLUSTER ADD (Field)

| Field Name | Description | | | | | | | | |
|---------------|--|-------|---|---------|---|---------|---|---------|--|
| PROTOCOL | Protocol version number and ECO level of the connection management software. | | | | | | | | |
| QDVOTES | Number of votes the remote system recommends be contributed by the quorum disk. Normally, the cluster manager sets this number using the system parameter QDSKVOTES. | | | | | | | | |
| QF_ACTIVE | Indicates whether the remote system's quorum file is accessible. | | | | | | | | |
| QF_SAME | Indicates whether the local and remote systems agree about which disk is the quorum disk. | | | | | | | | |
| QF_WATCHER | Remote system has an active connection to the quorum disk and can verify its connection for members unable to access the disk directly. | | | | | | | | |
| QUORUM | Derived from EXPECTED_VOTES and calculated by the connection manager. It represents an initial value for the minimum number of votes that must be present for this node to function. | | | | | | | | |
| RCVD_SQ | Sequence number of the last message received over the VMSccluster connection. | | | | | | | | |
| RECNXINTERVAL | Displays the time (in seconds) that the connection manager will wait before timing out the corresponding connection. It is the maximum of the value contained in the system parameter RECNXINTERVAL on the local node and the amount of time it would take for the connection manager on the remote node to discover that the connection is broken. | | | | | | | | |
| SEND_SQ | Sequence number of the next message to be sent over the VMSccluster connection. | | | | | | | | |
| STATUS | Status of the node in the cluster. Possible displays are as follows: <table> <tr> <td>blank</td><td>System is not being considered as a cluster member.</td></tr> <tr> <td>BRK_MEM</td><td>System is a member of the cluster, but the connection manager has lost communication with it.</td></tr> <tr> <td>BRK_NEW</td><td>System has just booted, but has not yet joined the cluster and the connection manager has lost communication with it.</td></tr> <tr> <td>BRK_NON</td><td>Connection manager has lost communication with the system and the system is no longer a member of the cluster.</td></tr> </table> | blank | System is not being considered as a cluster member. | BRK_MEM | System is a member of the cluster, but the connection manager has lost communication with it. | BRK_NEW | System has just booted, but has not yet joined the cluster and the connection manager has lost communication with it. | BRK_NON | Connection manager has lost communication with the system and the system is no longer a member of the cluster. |
| blank | System is not being considered as a cluster member. | | | | | | | | |
| BRK_MEM | System is a member of the cluster, but the connection manager has lost communication with it. | | | | | | | | |
| BRK_NEW | System has just booted, but has not yet joined the cluster and the connection manager has lost communication with it. | | | | | | | | |
| BRK_NON | Connection manager has lost communication with the system and the system is no longer a member of the cluster. | | | | | | | | |

| Field Name | Description |
|-----------------|---|
| BRK_REM | Connection manager has lost communication with the system, and the system has been removed from the cluster. |
| MEMBER | System is participating in the cluster. |
| NEW | System has just booted, but has not yet joined the cluster. If this system would normally be a member of the cluster and is displaying NEW in this field, you can expect that the display will eventually change to MEMBER. |
| NON | System is not a member of the cluster. |
| REMOVED | System has been removed from the cluster. |
| SW_VERS | Indicator of the software version running on the node. |
| TRANSITION_TIME | Time of the system's last change in membership status (See the STATUS field.) |
| UNACKED | Number of unacknowledged VMScluster messages received by the remote system. |
| VOTES | Number of votes the remote node contributes toward quorum. Normally, the cluster manager sets this number with the system parameter VOTES. |
| WARMCDRPS | Number of CDRPs on the CDRP free queue. |

SYSTEMS Class

The SYSTEMS class lists information about all systems in the cluster, such as their identification numbers, node names, hardware types, and software versions.

| Field Name | Description |
|-------------|--|
| DG_SIZE | Maximum number of bytes of application data in datagrams sent over the circuit. |
| HW_TYPE | System hardware type (for example, VAXstation 3100 or HS70). (Enclose the system type between double quotation marks.) |
| HW_VERS | Hardware configuration and revision levels of the remote system. |
| INCARNATION | Unique 16-digit hexadecimal number established when the system is booted. |
| INCN_TIME | Incarnation number expressed as a time (dd-mmm-yy hh:mm). |
| MSG_SIZE | Maximum number of bytes of application data in messages sent over the circuit. |

SHOW CLUSTER ADD (Field)

| Field Name | Description |
|--------------|--|
| NODE | Node name of the remote system. Normally, the cluster manager sets the node name using the system parameter SCSNODE. The node name should be the same as the DECnet node name. |
| NUM_CIRCUITS | Number of virtual circuits between the local system and remote systems. |
| SOFTWARE | Name and version of the operating system currently running on the remote system. |
| SYS_ID | Identification number of the remote system. Normally, the cluster manager sets this number using the system parameters SCSSYSTEMID and SCSSYSTEMIDH. This number should be the same as the DECnet node number. |

Qualifiers

None.

Description

The ADD (Field) command enables and adds specific fields of information to a SHOW CLUSTER display. When you add a field for a class that is not currently being displayed, the class heading of that field is added to the display. The qualifier /ALL on any ADD (Class) command adds all fields in the class to the display.

To remove a field from the SHOW CLUSTER display, enter the REMOVE (Field) command.

Examples

1. COMMAND> ADD SEND

The ADD command in this example enables the CREDITS class field SEND and adds it to the SHOW CLUSTER display.

2. COMMAND> ADD REM_STATE, REM_CONID, LOC_CONID

The ADD command in this example enables the CIRCUITS class field REM_STATE and the CONNECTIONS class fields REM_CONID and LOC_CONID, and adds them to the SHOW CLUSTER display.

ADD LOCAL_PORTS

Adds all currently enabled LOCAL_PORTS class fields to the SHOW CLUSTER display.

Format

ADD LOCAL_PORTS

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display.

Description

The **ADD LOCAL_PORTS** command adds **LOCAL_PORTS** class information to the **SHOW CLUSTER** display. This information includes data for all currently enabled fields in the **LOCAL_PORTS** class. By default, the **NAME**, **LP_STATUS** (port status), **PORT_NUM** (port number), **DGS_FREE** (free datagrams queued), **MSG_FREE** (free messages queued), **OPEN_CIRCS** (open circuits), and **FORM_CIRCS** (formative circuits) fields are enabled. For a list of valid **LOCAL_PORTS** class fields, see the **ADD (Field)** command.

Use the **ADD LOCAL_PORTS** command with the **REMOVE LOCAL_PORTS** command to turn the display of **LOCAL_PORTS** class information on and off. If you remove the **LOCAL_PORTS** class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the **LOCAL_PORTS** class and add new **LOCAL_PORTS** class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. **COMMAND> ADD LOCAL_PORTS**

The **ADD LOCAL_PORTS** command in this example adds **LOCAL_PORTS** class information to the display. This information includes all enabled **LOCAL_PORTS** class fields.

2. **COMMAND> REMOVE LOCAL_PORTS**
COMMAND> ADD LB_STATUS
COMMAND> REMOVE LOCAL_PORTS

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.
.

COMMAND> ADD LOCAL_PORTS

The **ADD LOCAL_PORTS** command in this example sequence adds **LOCAL_PORTS** class information to the **SHOW CLUSTER** display. The first command removes the **LOCAL_PORTS** class from the display. The second command, **ADD LB_STATUS**, adds the **LOCAL_PORTS** class field **LB_STATUS** to the display. As a result, all other **LOCAL_PORTS** class fields are disabled. When the **LOCAL_PORTS** class is removed and added again, only the **LB_STATUS** field is displayed.

SHOW CLUSTER ADD MEMBERS

ADD MEMBERS

Adds all currently enabled MEMBERS class fields to the SHOW CLUSTER display.

Format

ADD MEMBERS

Parameters

None.

Qualifier

/ALL

Specifies that all fields in this class are added to the display.

Description

The ADD MEMBERS command adds MEMBERS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the MEMBERS class. By default, the STATUS field is enabled. For a list of valid MEMBERS class fields, see the ADD (Field) command.

Use the ADD MEMBERS command with the REMOVE MEMBERS command to turn the display of MEMBERS class information on and off. If you remove the MEMBERS class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the MEMBERS class and add new MEMBERS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. COMMAND> ADD MEMBERS

The ADD MEMBERS command in this example adds MEMBERS class information to the display. This information includes all enabled MEMBERS class fields.

2. COMMAND> REMOVE MEMBERS
COMMAND> ADD VOTES
COMMAND> REMOVE MEMBERS

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·
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COMMAND> ADD MEMBERS

The ADD MEMBERS command in this example sequence adds MEMBERS class information to the SHOW CLUSTER display. The first command removes the MEMBERS class from the display. The second command, ADD VOTES, adds the MEMBERS class field VOTES to the display. As a result, all other MEMBERS class fields are disabled. When the MEMBERS class is removed and added again, only the VOTES field is displayed.

ADD SYSTEMS

Adds all currently enabled SYSTEMS class fields to the SHOW CLUSTER display for all active systems or for selected systems.

Format

ADD SYSTEMS [/qualifier[, ...]]

Parameters

None.

Qualifiers

/ALL

Specifies that all fields in the SYSTEMS class are added to the display.

/ID=ALL

Restores the display after selectively removing systems by ID.

/ID=system-id

Specifies, by system identification number, systems to be added to the SHOW CLUSTER display. The system-id number can be any system-id as displayed in the SYS_ID field of the SYSTEMS class. When using a hexadecimal value for an identifier, precede the number with the characters %X.

The /ID qualifier affects all information displayed about the specified system, not just information in the SYSTEMS class display.

/NODE=ALL

Restores the display after selectively removing systems by node name.

/NODE=node-name

Specifies, by node name, systems to be added to the SHOW CLUSTER display. The node-name can be any node displayed in the NODE field of the SYSTEMS class, and it can be enclosed in quotation marks. The /NODE qualifier affects all information displayed about the specified node, not just information in the SYSTEMS class display.

/TYPE=ALL

Restores the display after selectively removing systems by type.

/TYPE=hardware-type

Specifies, by hardware type, systems to be added to the SHOW CLUSTER display. You can specify any of the types shown in the HW_TYPE field, and you must enclose the type in quotation marks; for example, "VAX 8800". Because the quoted text may be abbreviated, it is possible, for example, to add VAXstation II and VAXstation 2000 systems with a single command. Multiple types may be specified if enclosed in parentheses and separated by commas. Hardware types are not case sensitive.

The /TYPE qualifier affects all information displayed about the specified hardware type, not just information in the SYSTEMS class display.

SHOW CLUSTER ADD SYSTEMS

Description

The ADD SYSTEMS command adds SYSTEMS class information to the SHOW CLUSTER display. This information includes data for all currently enabled fields in the SYSTEMS class. By default, the NODE and SOFTWARE fields are enabled. For a list of valid SYSTEMS class fields, see the ADD (Field) command.

Use the ADD SYSTEMS command with the REMOVE SYSTEMS command to turn the display of SYSTEMS class information on and off. If you remove the SYSTEMS class from the display and add it again without changing any fields, all of the same fields are displayed again. If, however, you remove the SYSTEMS class and add new SYSTEMS class fields, all previously enabled fields are disabled, and only the newly added fields are displayed.

Examples

1. `COMMAND> ADD SYSTEMS`

The ADD SYSTEMS command in this example adds SYSTEMS class information to the display. This information includes all enabled SYSTEMS class fields.

2. `COMMAND> ADD SYSTEMS/NODE=(PISHTA,ELF)`

The ADD SYSTEMS command in this example adds the nodes PISHTA and ELF to the SHOW CLUSTER display, reporting all currently enabled information about the nodes.

3. `COMMAND> ADD SYSTEMS/TYPE=("VAX 8800","MicroVAX 2000")`

The ADD SYSTEMS command in this example adds all VAX 8800 and MicroVAX 2000 processors to the SHOW CLUSTER display, reporting all currently enabled information about those hardware types.

4. `COMMAND> REMOVE SYSTEMS`
`COMMAND> ADD SYS_ID`
`COMMAND> REMOVE SYSTEMS`

`COMMAND> ADD SYSTEMS`

The ADD SYSTEMS command in this example sequence adds SYSTEMS class information to the SHOW CLUSTER display. The first command removes the SYSTEMS class from the display. The second command, ADD SYS_ID, adds the SYSTEMS class field SYS_ID to the display. As a result, all other SYSTEMS class fields are disabled. When the SYSTEMS class is removed and added again, only the SYS_ID field is displayed.

DEFINE/KEY

Associates an equivalence string and set of attributes with a key on the terminal keyboard. The /KEY qualifier is required.

Format

DEFINE/KEY key-name equivalence-string

Parameters**key-name**

Specifies the name of the key that you are defining. Use the following key names when defining keys:

| Key Name | LK201 | VT100 | VT52 |
|------------------|-------------|-----------|-----------|
| PF1 | PF1 | PF1 | [blue] |
| PF2 | PF2 | PF2 | [red] |
| PF3 | PF3 | PF3 | [gray] |
| PF4 | PF4 | PF4 | -- |
| KP0, KP1 to KP9 | 0, 1 to 9 | 0, 1 to 9 | 0, 1 to 9 |
| PERIOD | . | . | . |
| COMMA | , | , | n/a |
| MINUS | - | - | n/a |
| ENTER | Enter | ENTER | ENTER |
| Find (E1) | Find | -- | -- |
| Insert Here (E2) | Insert Here | -- | -- |
| Remove (E3) | Remove | -- | -- |
| Select (E4) | Select | -- | -- |
| Prev Screen (E5) | Prev Screen | -- | -- |
| Next Screen (E6) | Next Screen | -- | -- |
| HELP | Help | -- | -- |
| DO | Do | -- | -- |
| F17 to F20 | F17 to F20 | -- | -- |

equivalence-string

Specifies the string to be processed when you press the key. The string can be a SHOW CLUSTER command. If the string contains any spaces, enclose the equivalence string in quotation marks.

Qualifiers**/ECHO (default)****/NOECHO**

Determines whether the equivalence string is displayed on your screen after the key has been pressed. You cannot use /NOECHO with the /NOTERMINATE qualifier.

SHOW CLUSTER DEFINE/KEY

/ERASE

/NOERASE (default)

Determines whether the current line is erased before the key translation is inserted.

/IF_STATE=(state-name, ...)

/NOIF_STATE

Specifies a list of one or more states, one of which must take effect for the key definition to be in effect. If you omit the /IF_STATE qualifier or use /NOIF_STATE, the current state is used.

/LOCK_STATE

/NOLOCK_STATE (default)

Specifies that the state set by the /SET_STATE qualifier remain in effect until explicitly changed. If you use the /NOLOCK_STATE qualifier, the state set by /SET_STATE is in effect only for the next definable key that you press or for the next read-terminating character that you type.

The /LOCK_STATE qualifier can be specified only with the /SET_STATE qualifier.

/LOG (default)

/NOLOG

Controls whether the system displays a message indicating that the key definition has been successfully created.

/SET_STATE=state-name

/NOSET_STATE (default)

Causes the specified state-name to be set when the key is pressed. The state name can be any alphanumeric string.

If you omit the SET_STATE qualifier or use /NOSET_STATE, the current state that was locked remains in effect. If you have not included this qualifier with a key definition, use the SET KEY command to change the current state.

/TERMINATE

/NOTERMINATE (default)

Specifies whether the current equivalence string is to be terminated (that is, processed) when the key is pressed. Pressing RETURN has the same effect as using /TERMINATE.

The /NOTERMINATE qualifier allows you to create key definitions that insert text into command lines, after prompts, or into other text that you are typing.

Description

The DEFINE/KEY command enables you to assign definitions to the keys on certain terminals. The terminals include VT52s, the VT100 series, and terminals with LK201 keyboards, such as the VT200 series.

The equivalence string definition can contain different types of information. Definitions can consist of SHOW CLUSTER commands. When you define a key to insert a text string, use the /NOTERMINATE qualifier so that you can continue typing more data after the string has been inserted.

In most instances you will want to take advantage of the echo feature. The default setting is /ECHO. With the /ECHO qualifier set, the key definition is displayed on the screen each time you press the key.

You can use the /STATE qualifier to increase the number of key definitions available on your terminal. The same key can be assigned any number of definitions as long as each definition is associated with a different state. State names can contain any alphanumeric characters, dollar signs, and underscores. Generally, you want to create a state name that is easy to remember and type and, if possible, reminds you of the types of definitions you created for that state.

Example

```
Command> DEFINE/KEY PF3 "LOCAL_PORT"/NOTERMINATE
```

The DEFINE/KEY command in this example defines the PF3 key on the keypad to output the "LOCAL_PORT" text string. This key could be used with the ADD key to form the ADD LOCAL_PORT command.

DESELECT

Terminates the selection of a previously selected window. When the DESELECT command is entered after a MOVE command, Show Cluster completes the move operation when it deselects the window. See also the MOVE and SELECT commands for related information.

Format

DESELECT

Parameters

None.

Qualifiers

None.

Example

```
Command> DESELECT
```

When the DESELECT command is entered, the previously selected window is deselected and the window is no longer highlighted.

EXIT

Terminates the SHOW CLUSTER display and returns control to the DCL command level. You can also press Ctrl/Z to exit at any time.

Format

EXIT

SHOW CLUSTER EXIT

Parameters

None.

Qualifiers

None.

Example

```
COMMAND> EXIT
```

The **EXIT** command in this example terminates the **SHOW CLUSTER** display and returns control to the DCL command level.

HELP

Provides online help information to use **SHOW CLUSTER** commands, parameters, and qualifiers. Press Ctrl/Z to exit.

Format

```
HELP [keyword . . . ]
```

Parameter

keyword

Specifies the command, parameter, or qualifier for which help information is to be displayed. If you omit the keyword, **HELP** displays a list of available help topics, and prompts you for a particular keyword.

Qualifiers

None.

Examples

1.

```
COMMAND> HELP INITIALIZE
```

The **HELP** command in this example displays help information about the **SHOW CLUSTER** command, **INITIALIZE**.

2.

```
COMMAND> HELP FIELDS
```

The **HELP** command in this example displays help information about the valid field names that can be specified with the **ADD**, **REMOVE**, and **SET** commands.

INITIALIZE

Resets the display using the original default values for field names, class names, and field widths. It also restores any systems that were removed from the display by the REMOVE SYSTEMS command.

Format

INITIALIZE

Parameters

None.

Qualifiers

None.

Description

The INITIALIZE command resets the SHOW CLUSTER display to its default setting, consisting of the SCS window with data from the SYSTEMS class and the MEMBERS class. The report shows the node name, the software version, and the status of cluster members.

If you save a series of commands in an initialization file, using the SAVE command, SHOW CLUSTER automatically inserts an INITIALIZATION command at the beginning of the file. Any command procedure that you build should start with the INITIALIZE command. In this way, you always tailor the display from a known state.

Example

```
COMMAND> INITIALIZE
```

The INITIALIZE command in this example resets the current display to the default display and restores any systems that were removed from the display.

MOVE

Moves a selected window to a specified position.

Format

MOVE direction value

SHOW CLUSTER MOVE

Parameters

direction

Specifies the direction in which the window is to be moved. If you do not enter a direction for this parameter, SHOW CLUSTER prompts you for one. You must specify one of the following keywords:

UP
DOWN
RIGHT
LEFT

value

Number of columns or lines the window is to be moved. You must specify a numeric value from 1 to 511. If you do not enter a number for this parameter, SHOW CLUSTER prompts you for one.

Qualifiers

None.

Description

The MOVE command allows you to reposition a window manually on the display screen. With one window in the SHOW CLUSTER display, you can enter MOVE commands directly. However, with multiple windows, you must select the appropriate window (SELECT window-name) before invoking MOVE commands. The MOVE command implicitly disables AUTO_POSITIONING.

To move a selected window, either enter MOVE commands at the command prompt or use the arrow keys defined as MOVE commands. Entering the command SET FUNCTION MOVE redefines the direction keys as MOVE UP 1, MOVE DOWN 1, MOVE RIGHT 1, and MOVE LEFT 1, respectively.

When you enter a MOVE command, the window changes position by column (horizontally), or by line (vertically). An empty frame appears around the new window position. When you are satisfied with the position of the window, enter the DESELECT command, which moves the window to the new position. Entering another SELECT command before the previous window has been deselected also moves the window to its new position.

Note

If you set the function to MOVE, the arrow keys are no longer defined to perform DCL line-mode editing. Only one function can be enabled at a time, using the SET FUNCTION command.

Example

```
Command> SELECT CLUSTER
Command> MOVE RIGHT 10
Command> DESELECT
```

The command sequence in this example moves the CLUSTER window 10 columns to the right.

PAN

Exhibits a wide display area, a part at a time, as though being unrolled.

Format

PAN direction value

Parameters

direction

Specifies the direction in which the display is to be panned. If you do not enter a direction for this parameter, SHOW CLUSTER prompts you for one. You must specify one of the following keywords:

UP
DOWN
RIGHT
LEFT

value

Number of columns or lines the display is to be panned. You must specify a numeric value from 1 to 511. If you do not enter a number for this parameter, SHOW CLUSTER prompts you for one.

Qualifiers

None.

Description

The PAN commands rotate the entire display by column (horizontally) and by line (vertically). A portion of the display that extends beyond the limits of the screen can be brought into view.

The display moves in the opposite direction from that specified by the PAN command. In other words, a PAN LEFT 10 command moves the display 10 columns to the right, similar to the effect of panning a camera over a landscape.

To pan the display, either enter PAN commands at the command prompt, or use the arrow keys defined as PAN commands. Entering the command SET FUNCTION PAN redefines the ↑, ↓, →, and ← arrow keys as PAN UP 1, PAN DOWN 1, PAN RIGHT 1, and PAN LEFT 1, respectively.

Note

If you set the function to PAN, the arrow keys are no longer defined to perform DCL line-mode editing. Only one function can be enabled at a time, using the SET FUNCTION command.

SHOW CLUSTER PAN

Example

Command> PAN DOWN 10

The PAN command in this example pans the display 10 lines.

REFRESH

Clears the screen, removes extraneous characters, and updates all fields. Pressing Ctrl/W has the same effect as entering REFRESH.

Format

REFRESH

Parameters

None.

Qualifiers

None.

Example

Command> REFRESH

The REFRESH command in this example clears the screen, removes extraneous characters, and updates all fields.

REMOVE CIRCUITS

Removes CIRCUITS class information from the SHOW CLUSTER display.

Format

REMOVE CIRCUITS [/qualifier[, . . .]]

Parameters

None.

Qualifiers

/TYPE=ALL

Specifies that all types of circuits on each system be removed from the display, including formative, open, and closing circuits. If you specify the REMOVE CIRCUITS command without any qualifiers, all types of circuits are removed from the display by default.

/TYPE=OPEN

/TYPE=NOOPEN

Controls whether open circuits or nonopen circuits are removed from the display.

Description

The **REMOVE CIRCUITS** command removes **CIRCUITS** class information from the **SHOW CLUSTER** display. **CIRCUITS** class information includes data for all currently enabled fields in the **CIRCUITS** class. For a list of valid **CIRCUITS** class fields, see the **ADD (Field)** command.

Examples

1. **COMMAND> REMOVE CIRCUITS**

The **REMOVE CIRCUITS** command in this example removes all currently enabled **CIRCUITS** class fields from the display.

2. **COMMAND> REMOVE CIRCUITS/TYPE=OPEN**

The **REMOVE CIRCUITS** command in this example removes all open circuits from the display.

REMOVE CLUSTER

Removes **CLUSTER** class information from the **SHOW CLUSTER** display.

Format

REMOVE CLUSTER

Parameters

None.

Qualifiers

None.

Description

The **REMOVE CLUSTER** command removes **CLUSTER** class information from the **SHOW CLUSTER** display. **CLUSTER** class information includes data for all currently enabled fields in the **CLUSTER** class. For a list of valid **CLUSTER** class fields, see the **ADD (Field)** command.

Example

COMMAND> REMOVE CLUSTER

The **REMOVE CLUSTER** command in this example removes all currently enabled **CLUSTER** class fields from the **SHOW CLUSTER** display.

SHOW CLUSTER REMOVE CONNECTIONS

REMOVE CONNECTIONS

Removes CONNECTIONS class information from the SHOW CLUSTER display.

Format

REMOVE CONNECTIONS [/qualifier[, ...]]

Parameters

None.

Qualifiers

/NAME=ALL

Removes all connections currently displayed by SHOW CLUSTER. This qualifier allows you to clear the display before adding specific connection information with the command ADD CONNECTIONS/NAME=local-process-name.

/NAME=local-process-name

Specifies the local process name of connections that are to be removed from the display. A local process name appears in the LOC_PROC_NAME field; it can be up to 16 characters in length. If the local process name is abbreviated, SHOW CLUSTER removes all local process names matching the abbreviation.

/TYPE=ALL

Specifies that all types of connections on each circuit be removed from the SHOW CLUSTER display.

/TYPE=OPEN

/TYPE=NOOPEN

Controls whether connections in the open or nonopen state are removed from the SHOW CLUSTER display.

Description

The REMOVE CONNECTIONS command removes CONNECTIONS class information from the SHOW CLUSTER display. CONNECTIONS class information includes data for all currently enabled fields in the CONNECTIONS class. For a list of valid CONNECTIONS class fields, see the ADD (Field) command.

Examples

1. COMMAND> REMOVE CONNECTIONS

The REMOVE CONNECTIONS command in this example removes all currently enabled CONNECTIONS class fields from the SHOW CLUSTER display.

2. COMMAND> REMOVE CONNECTIONS/NAME=(VMS\$DISK_CL_DRVR,VMS\$TAPE_CL_DRVR)

The REMOVE CONNECTIONS command in this example removes the CONNECTIONS class fields associated with the local process names VMS\$DISK_CL_DRVR and VMS\$TAPE_CL_DRVR from the SHOW CLUSTER display.

3. `COMMAND> REMOVE CONNECTIONS/TYPE=OPEN`

The **REMOVE CONNECTIONS** command in this example removes all **OPEN** connections from the **SHOW CLUSTER** display.

REMOVE COUNTERS

Removes **COUNTERS** class information from the **SHOW CLUSTER** display.

Format

`REMOVE COUNTERS`

Parameters

None.

Qualifiers

None.

Description

The **REMOVE COUNTERS** command removes **COUNTERS** class information from the **SHOW CLUSTER** display. **COUNTERS** class information includes data for all currently enabled fields in the **COUNTERS** class. For a list of valid **COUNTERS** class fields, see the **ADD (Field)** command.

Example

`COMMAND> REMOVE COUNTERS`

The **REMOVE COUNTERS** command in this example removes all currently enabled **COUNTERS** class fields from the **SHOW CLUSTER** display.

REMOVE CREDITS

Removes **CREDITS** class information from the **SHOW CLUSTER** display.

Format

`REMOVE CREDITS`

Parameters

None.

Qualifiers

None.

SHOW CLUSTER REMOVE CREDITS

Description

The REMOVE CREDITS command removes CREDITS class information from the SHOW CLUSTER display. CREDITS class information includes data for all currently enabled fields in the CREDITS class. For a list of valid CREDITS class fields, see the ADD (Field) command.

Example

```
COMMAND> REMOVE CREDITS
```

The REMOVE CREDITS command in this example removes all currently enabled CREDITS class fields from the SHOW CLUSTER display.

REMOVE ERRORS

Removes ERRORS class information from the SHOW CLUSTER display.

Format

```
REMOVE ERRORS
```

Parameters

None.

Qualifiers

None.

Description

The REMOVE ERRORS command removes ERRORS class information from the SHOW CLUSTER display. ERRORS class information includes data for all currently enabled fields in the ERRORS class. For a list of valid ERRORS class fields, see the ADD (Field) command.

Example

```
COMMAND> REMOVE ERRORS
```

The REMOVE ERRORS command in this example removes all currently enabled ERRORS class fields from the SHOW CLUSTER display.

REMOVE (Field)

Disables the display of specific fields of SHOW CLUSTER information.

Format

```
REMOVE field-name[ , ... ]
```


Parameters

field-name

Specifies one or more fields of information to be removed from the display of a particular class. If you specify more than one field name, insert a comma between each one. For a list of valid field names, see the ADD (Field) command description.

Qualifiers

None.

Examples

1. `COMMAND> REMOVE SOFTWARE`

The REMOVE command in this example removes the SYSTEMS class field SOFTWARE from the display.

2. `COMMAND> REMOVE SOFTWARE,RP_TYPE,CON_STATE`

The REMOVE command in this example removes the SOFTWARE, RP_TYPE, and CON_STATE fields from the SHOW CLUSTER display.

REMOVE LOCAL_PORTS

Removes LOCAL_PORTS class information from the SHOW CLUSTER display.

Format

`REMOVE LOCAL_PORTS`

Parameters

None.

Qualifiers

None.

Description

The REMOVE LOCAL_PORTS command removes LOCAL_PORTS class information. For a list of valid LOCAL_PORTS class fields, see the ADD (Field) command.

Example

`COMMAND> REMOVE LOCAL_PORTS`

The REMOVE LOCAL_PORTS command in this example removes all currently enabled LOCAL_PORTS class fields from the LOCAL_PORTS display.

SHOW CLUSTER REMOVE MEMBERS

REMOVE MEMBERS

Removes MEMBERS class information from the SHOW CLUSTER display.

Format

REMOVE MEMBERS

Parameters

None.

Qualifiers

None.

Description

The REMOVE MEMBERS command removes MEMBERS class information from the SHOW CLUSTER display. MEMBERS class information includes data for all actively participating members of the cluster. For a list of valid MEMBERS class fields, see the ADD (Field) command.

Example

```
COMMAND> REMOVE MEMBERS
```

The REMOVE MEMBERS command in this example removes all currently enabled MEMBERS class fields from the SHOW CLUSTER display.

REMOVE SYSTEMS

Removes SYSTEMS class information from the SHOW CLUSTER display.

Format

REMOVE SYSTEMS [/qualifier[, . . .]]

Parameters

None.

Qualifiers

/ID=ALL

Removes all systems information from the SHOW CLUSTER display. The qualifier clears the display so that you can selectively add systems with the command ADD SYSTEMS/ID=system-id.

/ID=system-id

Specifies, by system identification number, systems to be removed from the SHOW CLUSTER display. The system identification number can be any system identification as displayed in the SYS_ID field of the SYSTEMS class of the CLUSTER report.

SHOW CLUSTER REMOVE SYSTEMS

The /ID qualifier affects all information displayed about the specified system, not just information in the SYSTEMS class display.

/NODE=ALL

Removes all systems information from the SHOW CLUSTER display. The qualifier clears the display so that you can selectively add systems with the command ADD SYSTEMS/NODE=node-name.

/NODE=node-name

Specifies, by node name, systems to be removed from the SHOW CLUSTER display. The /NODE qualifier affects all information displayed about the specified node, not just information in the SYSTEMS class display.

/TYPE=ALL

Removes all systems information from the SHOW CLUSTER display. The qualifier clears the display so that you can selectively add systems with the command ADD SYSTEMS/TYPE=hardware-type.

/TYPE=hardware-type

Specifies, by hardware type, systems to be added to the SHOW CLUSTER display. You can specify any of the types shown in the HW_TYPE field, and you must enclose the type in quotation marks, for example: "VAX 8800". Because the quoted text may be abbreviated, it is possible, for example, to remove VAXstation II and VAXstation 2000 systems with a single command. Multiple types may be specified if enclosed in parentheses and separated by commas. Hardware types are not case sensitive.

The /TYPE qualifier affects all information displayed about the specified hardware type, not just information in the SYSTEMS class display.

Description

The REMOVE SYSTEMS command removes SYSTEMS class information from the SHOW CLUSTER display. SYSTEMS class information includes data for all currently enabled fields in the SYSTEMS class. For a list of valid SYSTEMS class fields, see the ADD (Field) command.

Examples

1. `COMMAND> REMOVE SYSTEMS`

The REMOVE SYSTEMS command in this example removes all currently enabled SYSTEMS class fields from the SHOW CLUSTER display.

2. `COMMAND> REMOVE SYSTEMS/ID=(1976,206)`

The REMOVE SYSTEMS command in this example removes systems with the identifier of 1976 or 206 from the SHOW CLUSTER display.

3. `COMMAND> REMOVE SYSTEMS/TYPE="VAX 8800"`

The REMOVE SYSTEMS command in this example removes all VAX 8800 systems from the SHOW CLUSTER display.

SHOW CLUSTER SAVE

SAVE

Allows you to build a startup initialization file or a command procedure that creates the current display. You can then use the initialization file or the command procedure to restore the display at a later time.

Format

SAVE [file-spec]

Parameter

file-spec

Names the file specification of the command file. The file name defaults to SHOW_CLUSTER.COM. You can edit the file because it is an ASCII file.

Qualifiers

None.

Description

The SAVE command allows you to build a startup initialization file or a command procedure that you can use in subsequent SHOW CLUSTER sessions. To use the SAVE command, perform the following steps:

1. Customize the display to meet your needs by using SHOW CLUSTER commands.
2. Enter the SAVE command. By default, the command procedure created is named SHOW_CLUSTER.COM. If you want a name that is different from the default, specify the alternate name on the SAVE command line. You save a startup initialization file as an .INI file.
3. Edit the file to improve its efficiency and document it.

The file that results from the SAVE command is an ASCII file. You will see that the SAVE command inserts an INITIALIZE command as the first line of the file. In this way, the initialization file or the command procedure always starts with the default display.

The SAVE command might not enter SHOW CLUSTER commands into the file in the same order in which you entered them. It might be necessary to edit the file and correct the sequence of commands. Also, the commands that the SAVE command builds are restricted to one record, so a particular command procedure might not be as efficient as possible. For example, the SAVE command processes "ADD class", "ADD class /ALL", and "ADD (Field)" commands separately. It does not combine an "ADD class" and an "ADD (Field)" command to produce the command "ADD class, field".

Additionally, the SAVE command does not use the "REMOVE (Field)" command. For example, the following command sequence adds all fields in the CIRCUITS class and then removes one field from the CIRCUITS class:

```
Command> ADD CIRCUITS/ALL  
Command> REMOVE RP_TYPE
```


Instead of removing one field from a class, the SAVE command produces a file with commands that add every field in the CIRCUITS class except RP_TYPE:

```
ADD LPORT NAME, RPORT NUM, RP_OWNER, NUM_CONNECTIONS, CIR_STATE  
ADD REM_STATE, CABLE_STATUS, RP_REVISION, RP_FUNCTIONS, SCS_WAITERS
```

Example

```
Command> ADD CLUSTER  
Command> REMOVE SOFTWARE  
Command> SAVE
```

The first two commands in the command sequence customize the SHOW CLUSTER display. The third command, SAVE, creates a command file, SHOW_CLUSTER.COM, which contains the following commands:

```
INITIALIZE  
ADD CLUSTER  
REMOVE SYSTEMS  
ADD NODE
```

SCROLL

Scrolls a window.

Format

SCROLL direction value

Parameters

direction

Direction in which a window is to be scrolled. If you do not enter a direction for this parameter, SHOW CLUSTER prompts you for one. You must specify one of the following keywords:

```
UP  
DOWN  
RIGHT  
LEFT
```

value

Number of fields or lines a window is to be scrolled. You must specify a numeric value from 1 to 511. If you do not enter a number for this parameter, SHOW CLUSTER prompts you for one.

Qualifiers

None.

Description

The SCROLL command provides a means of quickly scanning through a window by field (horizontally) and by line (vertically). You can scroll windows independently. Note, however, that if AUTO_POSITIONING is set to ON, other windows in the display may change position as you scroll the selected window.

SHOW CLUSTER SCROLL

To scroll a window when it is the only one in the display, enter the SCROLL command. When the display has multiple windows, you must first select a window by entering the SELECT command. The selected window becomes highlighted. Enter SCROLL commands either at the command line or by pressing the arrow keys. Entering the command SET FUNCTION SCROLL redefines the ↑, ↓, →, and ← arrow keys as SCROLL UP 1, SCROLL DOWN 1, SCROLL RIGHT 1, and SCROLL LEFT 1, respectively.

Use the vertical and horizontal lines of the window fields as indicators of the current position of the display. Note that the window headings remain stationary as lines of data are scrolled vertically.

Note

If you set the function to SCROLL, the arrow keys are no longer defined to perform DCL line-mode editing. Only one function can be enabled at a time, using the SET FUNCTION command.

Example

```
Command> SELECT SCS
Command> SCROLL UP 10
Command> DESELECT
```

The command sequence in this example scrolls the SCS window up 10 lines.

SELECT

Designates which window to scroll, move, or pan.

Format

```
SELECT [window-name]
```

Parameter

window-name

The name of the selected window. You can specify one of the following window names: SCS, LOCAL_PORTS, or CLUSTER.

Qualifiers

None.

Description

When the SHOW CLUSTER display contains more than one window, you must indicate which window you want to work with—either by entering a SELECT command at the command line prompt or by pressing the SELECT key on the default keypad.

If you press the SELECT key on the keypad or enter the SELECT command without specifying the window name, SHOW CLUSTER selects a window for you. Pressing the SELECT key repeatedly cycles through the windows in the order in which they were initially added to the screen. Each subsequent SELECT command terminates the previous one. The currently selected window becomes highlighted. When the last window in the cycle has been selected, pressing the SELECT key another time begins the cycle again.

Use the SELECT command to identify a window to be moved, panned, or scrolled. Once the display is correct, terminate the window operation by entering a DESELECT command or by selecting another window. For more information, see the SET FUNCTION, SCROLL, PAN, and MOVE commands.

Example

```
Command> SELECT LOCAL_PORTS
```

The SELECT command in this example selects the LOCAL_PORTS window. You can then perform a MOVE or SCROLL operation on the selected window.

SET AUTO_POSITIONING

Enables or disables the automatic positioning of windows within a display.

Format

```
SET AUTO_POSITIONING keyword
```

Parameter

keyword

Specifies whether windows are automatically positioned in a display. By default, SHOW CLUSTER operates with AUTO_POSITIONING enabled. Valid keywords are as follows:

ON
OFF

Qualifiers

None.

Description

By default, SHOW CLUSTER automatically positions windows based on their sizes and the order in which they were originally added to the display. With AUTO_POSITIONING set to ON, windows do not overlap, but they may extend partially or fully beyond the physical limits of the terminal screen. Setting AUTO_POSITIONING to OFF allows you to position the window manually within the display.

Entering a MOVE command implicitly disables AUTO_POSITIONING. When you use MOVE commands to position a selected window, the windows are allowed to overlap.

Setting AUTO_POSITION to ON reestablishes the previous positions of windows.

SHOW CLUSTER SET AUTO_POSITIONING

Example

```
Command> SET AUTO POSITIONING OFF
Command> ADD LOCAL PORTS
Command> SELECT SCS
Command> MOVE DOWN 8
Command> DESELECT
```

The command sequence in this example disables AUTO_POSITIONING to add the LOCAL_PORTS window at the top of the screen. The following commands move the SCS window below the LOCAL_PORTS window, where it is in full view.

SET (Field)

Modifies the characteristics of particular fields within the display.

Format

SET field-name /qualifier[, . . .]

Parameter

field-name

Specifies the name of the field to be modified in the display. For a list of field names, see the ADD (Field) command.

Qualifiers

/WIDTH=field-width

Specifies the number of columns used to display the specified field. This qualifier shrinks the display to allow room for more fields or expands it to make it easier to read.

Minimum, maximum, and default values for field widths are set up internally. If you specify a field width of 0, the field is set to its minimum width. If you specify a field width that is larger than the internal maximum width, the field is set to its maximum width.

Note

If the field width is too narrow to display a particular numeric field, asterisks are displayed in place of the data; if the width is too narrow to display a character string field, the character string is truncated on the right.

/FORMAT=radix

Specifies the display format used to display the specified field. You can specify either of the following radix values:

- DECIMAL for decimal format
- HEXADECIMAL for hexadecimal format

A hexadecimal display for a field uses fewer columns than a decimal display.

The hardware version field (HW_VERSION) is always displayed in 24 hexadecimal digits.

Example

```
COMMAND> SET SYSID/FORMAT=HEXADECIMAL
```

The SET command in this example changes the format of the SYSID field to a hexadecimal display.

SET FUNCTION

Enables one of the following SHOW CLUSTER functions: EDIT, MOVE, PAN, or SCROLL.

Format

SET FUNCTION function-name

Parameter

function-name

Specifies the SHOW CLUSTER function to be enabled. By default, the EDIT function is enabled. Functions include the following:

EDIT
MOVE
PAN
SCROLL

Qualifiers

None.

Description

The SET FUNCTION command redefines the arrow keys to perform the specified function. By default, the function is set to EDIT, which allows you to use the arrow keys to recall a previously entered command or perform DCL line-mode editing at the command prompt. (See the *OpenVMS User's Manual* for more information on DCL line-mode editing.)

To enable one of the SHOW CLUSTER functions, either enter the specific SET FUNCTION command at the command prompt, or press the appropriate SET FUNCTION key on the keypad. Only one function can be enabled at a time.

Note

Setting the function to MOVE implicitly disables AUTO_POSITIONING. Also, once you use the SET FUNCTION command, the arrow keys are no longer defined to perform DCL line-mode editing. Only one function can be enabled at a time, using the SET FUNCTION command.

SHOW CLUSTER SET FUNCTION

Example

Command> SET FUNCTION MOVE

This command redefines the arrow keys to automatically move a selected window 1 space in any direction. For example, the ↑, ↓, →, and ← arrow keys are redefined as MOVE UP 1, MOVE DOWN 1, MOVE RIGHT 1, and MOVE LEFT 1, respectively. Note that you must use the DESELECT command to complete the MOVE function.

SET INTERVAL

Changes the interval time between display updates. The interval time is the amount of time that display information remains on the screen before it is updated. By default, the display updates every 15 seconds, unless you use the /INTERVAL qualifier on the SHOW CLUSTER command. If you use the /INTERVAL qualifier on the SHOW CLUSTER command, the time specified becomes the default.

Format

SET INTERVAL=seconds

Parameter

seconds

The number of seconds between display updates.

Qualifiers

None.

Example

COMMAND> SET INTERVAL=5

The SET INTERVAL command in this example changes the display interval time to 5 seconds.

SET SCREEN

Sets the terminal to a display of up to 511 columns. This command can be used only on Digital-compatible terminals.

Format

SET SCREEN=screen-width

Parameter

screen-width

Specifies the width of the screen display. Depending on terminal type, you can specify a value up to 511.

Qualifiers

None.

Description

The SET SCREEN command redefines the width of the display to the number of columns that you specify.

If you use an initialization file in noncontinuous mode and the initialization file contains a SET SCREEN command that changes the screen size, SHOW CLUSTER sets the screen to the specified size for one update interval and then resets the screen to the original size.

Example

```
COMMAND> SET SCREEN=132
```

The SET SCREEN command in this example sets the screen width to 132 columns.

WRITE

Outputs the current display to a file that can be printed on a hardcopy device.

Format

WRITE [file-spec]

Parameter

file-spec

Names the file specification of the printable output file. By default, the output file name is SHOW_CLUSTER.LIS.

Qualifiers

/ALL

Indicates that the output file should contain a display consisting of all classes and all fields. Because SHOW CLUSTER may not currently have the information necessary to display all the possible fields when you specify the /ALL qualifier, a display update occurs prior to the output of the file. As a result, the output file may differ from the display on the screen at the time the command was entered. The screen is updated along with the file output, so subsequently they are the same.

You should use the /ALL qualifier to produce an output file or hardcopy file when reporting a cluster-related problem to Digital.

Example

```
Command> WRITE/ALL
```

The WRITE command in this example creates a file, SHOW_CLUSTER.LIS, which contains all possible SHOW CLUSTER fields. SHOW_CLUSTER.LIS can be printed on a hardcopy device.

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System Generation Utility

SYSGEN Description

The System Generation utility (SYSGEN) is a system management tool used to tailor a system for a specific hardware and software configuration. Use SYSGEN commands to manipulate specific parts of the operating system, as follows:

- System parameters: DISABLE, ENABLE, SET, SHOW, USE, and WRITE.
- Devices and device drivers: SHOW/CONFIGURATION, SHOW/DEVICE, SHOW/DRIVER, SHOW/TURBOCHANNEL, and SHOW/UNIBUS. The SYSGEN device table in Appendix D lists characteristics of Digital devices that SYSGEN configures automatically. A complete description of devices and device drivers, is in the *OpenVMS VAX Device Support Manual*.
- System files: CREATE and INSTALL.
- Startup command procedure: SET/STARTUP and SHOW/STARTUP.
- Multiport memory: SHARE and SHARE/INITIALIZE.

You can use a subset of the SYSGEN commands to invoke the SYSBOOT facility during bootstrap operations; see the installation instructions for your processor and the *OpenVMS System Manager's Manual* for more information.

5.1 Specifying Values for SYSGEN Qualifiers and Parameters

Normally, you specify values as an integer, keyword, or file specification. For parameters, integer values must be within the defined maximum and minimum values for the parameter unless the SYSGEN command DISABLE CHECKS was specified.

You can specify values for certain SYSGEN qualifiers and parameters in hexadecimal or octal radices and for others as an ASCII string. To specify a value in octal or hexadecimal, precede the value with %O or %X, respectively. To specify a value in ASCII, enclose the value string in quotation marks (" ").

Appendix C lists system parameters.

5.2 Active and Current Parameter Values

Understanding the terms active and current is important when they refer to system parameters. An **active parameter** is one whose value is active when the system is running. Active parameters that can be changed on a running system are categorized as dynamic parameters. (See Appendix C.) A **current parameter** is one whose value is stored on disk (SYS\$SYSTEM:VAXVMSSYS.PAR on VAX systems or SYS\$SYSTEM:ALPHAVMSSYS.PAR on Alpha systems) and used for booting the system. Current parameters become active parameters when the system boots.

Modifying active parameters with SYSGEN has no effect on the values of the stored current parameters; you change the values of these parameters only while the system is running. In a subsequent bootstrap of the system, the old values of the current parameters are established as the active parameters. To change the values of the current parameters on disk, use the SYSGEN command WRITE CURRENT. To change the values of any active parameter that is not in the dynamic category, enter the WRITE CURRENT command and reboot the system.

SYSGEN Usage Summary

The System Generation utility (SYSGEN) is a system management tool that performs certain privileged system configuration functions. With SYSGEN, you can create and modify system parameters, load device drivers, and create additional page and swap files.

Format

RUN SYS\$SYSTEM:SYSGEN

Parameters

None.

Usage Summary

To invoke SYSGEN, enter RUN SYS\$SYSTEM:SYSGEN at the DCL command prompt. At the SYSGEN> prompt, enter any of the SYSGEN commands described in the following section. These commands follow the standard rules of grammar as specified in the *OpenVMS DCL Dictionary*.

To exit from SYSGEN, enter the EXIT command at the SYSGEN> prompt or press Ctrl/Z. You can direct output from a SYSGEN session to an output file using the SET/OUTPUT command. By default, output is written to SYS\$OUTPUT.

Note

Digital recommends the use of the AUTOGEN command procedure when modifying system parameters, loading device drivers, or creating additional page and swap files. Refer to the *OpenVMS System Management Utilities Reference Manual: A-L* for a description of AUTOGEN.

SYSGEN Commands

This section describes and provides examples of SYSGEN commands.

AUTOCONFIGURE (VAX Only)

VAX

On VAX systems, automatically connects devices that are physically attached to the system and loads their drivers. On Alpha systems, use the SYSMAN command IO AUTOCONFIGURE.

Use of the AUTOCONFIGURE command requires the CMKRNL privilege.

Format

AUTOCONFIGURE adapter-spec

AUTOCONFIGURE ALL

Parameter

adapter-spec

Specifies the adapter specification (backplane interconnect arbitration line) or slot number of the single UNIBUS or MASSBUS adapter that is to be configured. The adapter specification can be expressed as an integer or with one of the names listed by the SYSGEN command SHOW/ADAPTER.

You can specify AUTOCONFIGURE ALL to configure all standard devices attached to the system.

Caution

If you use the AUTOCONFIGURE ALL command on a running system with active UNIBUS or Q-bus devices, it could result in unpredictable behavior.

Qualifiers

/EXCLUDE=(device-name[,...])

Specifies the device types that you do not want automatically configured.

You can specify a device-type code as shown in Table 5-1 or a standard device name as shown in Appendix D. You can include a controller designation but not a unit number. If the controller designation is omitted, all devices of the specified type are excluded. The device-name specification defaults to all devices on the adapter. Do not use this qualifier with the /SELECT qualifier.

/LOG

Produces a display of the controller and its units on the current SYS\$OUTPUT device after they have been successfully autoconfigured. Each controller and its associated units are displayed only after AUTOCONFIGURE has found the next controller. Therefore, the error message displays precede the display of the controller and units that caused the error.

SYSGEN AUTOCONFIGURE (VAX Only)

/SELECT=(device-name[,...])

Specifies the device types that you want automatically configured.

You can specify a device-type code as shown in Table 5-1 or a standard device name as shown in Appendix D. You can include a controller designation but not a unit number. If the controller designation is omitted, all devices of the specified type are selected. The device-name specification defaults to all devices on the adapter.

Do not use /SELECT with the /EXCLUDE qualifier.

Table 5-1 Device Type Codes

| Code | Device Type |
|-------------|---|
| CR | Card Reader |
| CS | Console Storage Device |
| DB | RP05, RP06 Disk |
| DD | TU58 Cartridge Tape |
| DJ | RA60 Disk |
| DL | RL02 Cartridge Disk |
| DM | RK06, RK07 Cartridge Disk |
| DQ | RL02 Cartridge Disk, R80 Disk |
| DR | RM03, RM05, RM80, RP07 Disk |
| DU | UDA Disk |
| DX | RX01 Diskette |
| DY | RX02 Diskette |
| LA | LPA11-K Laboratory Peripheral Accelerator |
| LC | Line Printer on DMF32 |
| LP | Line Printer on LP11 |
| MB | Mailbox |
| MF | TU78 Magnetic Tape |
| MS | TS11 Magnetic Tape |
| MT | TE16, TU45, TU77 Magnetic Tape |
| MU | Tape Class Driver |
| NET | Network Communications Logical Device |
| NL | System "Null" Device |
| OP | Operator's Console |
| PA | Computer Interconnect |
| PT | TU81 Magnetic Tape |
| PU | UDA-50 |
| RT | Remote Terminal |
| TT | Interactive Terminal on DZ11 |
| TX | Interactive Terminal on DMF32, DMZ32, DHU11, or DMB32 |
| XA | DR11-W General-Purpose DMA Interface |

(continued on next page)

Table 5-1 (Cont.) Device Type Codes

| Code | Device Type |
|------|--|
| XD | DMP-11 Synchronous Communications Line |
| XF | DR32 Interface Adapter |
| XG | DMF32 Synchronous Communications Line |
| XI | DR Interface on DMF32 |
| XJ | DUP11 Synchronous Communications Line |
| XM | DMC11 Synchronous Communications Line |

Examples

1. SYSGEN> AUTOCONFIGURE ALL

The command in this example automatically configures all standard devices.

2. SYSGEN> AUTOCONFIGURE ALL/SELECT=(TT,MTA,LP)

The command in this example automatically configures all terminals, all magnetic tape units on controller A, and all line printers.

3. SYSGEN> AUTOCONFIGURE ALL/EXCLUDE=XM

The command in this example illustrates the use of the /EXCLUDE qualifier to autoconfigure all but the DMC11 devices, assuming DECnet will not be operating on this system. ♦

CONFIGURE (VAX Only)

VAX

On VAX systems, requests UNIBUS device names and issues the set of CSR and vector addresses that AUTOCONFIGURE will use.

Format

CONFIGURE

Parameters

None.

Qualifiers

/INPUT=file-spec

Specifies the name of an input file from which previously prepared data is read. By default, input data is read from SYS\$INPUT.

/OUTPUT=file-spec

Specifies the name of an output file to which output from CONFIGURE is written. By default, output is directed to SYS\$OUTPUT. The default file type is .LIS.

SYSGEN CONFIGURE (VAX Only)

/RESET

/NORESET

Controls whether controller names are reset. The /NORESET qualifier is useful with multiple UNIBUS systems. When you specify /NORESET, it is not necessary to specify the second parameter (p) on subsequent CONFIGURE commands, because the controller names are not reset. By default, if you omit /NORESET, the controller names are reset.

Description

The CONFIGURE command issues the following prompt:

DEVICE>

Input should be in the following form, where *device* is the name of the controller:

device[[,n],p]

Possible controller names are listed in the second column in Table D-1. You cannot abbreviate controller names.

You can optionally specify *n*, the number of devices on the UNIBUS being configured, and *p*, the optional number of devices on all previous UNIBUS devices in a multiple UNIBUS system. Note that *p* affects only the device names, not the addresses generated. By default, *n* is 1 and *p* is 0.

SYSGEN continues to prompt for devices until you enter Ctrl/Z. SYSGEN then displays the control and status register (CSR) and vector addresses for the devices specified.

Note that CONFIGURE does not look at the actual hardware configuration of the system. Rather, CONFIGURE determines which CSR and vector addresses AUTOCONFIGURE would use if the specified hardware was installed.

Example

```
SYSGEN> CONFIGURE
DEVICE> DZ11,3,2
DEVICE> LP11
DEVICE> DMC11,2
DEVICE> CtrlZ
```

The system displays the following data:

| | | | | | | | | | |
|---------|-------|-------|-----|------|---------|---------|------|----------|-----|
| Device: | RK611 | Name: | DMA | CSR: | 777440 | Vector: | 210 | Support: | yes |
| Device: | LP11 | Name: | LPA | CSR: | 777514 | Vector: | 200 | Support: | yes |
| Device: | DMC11 | Name: | XMA | CSR: | 760070* | Vector: | 300* | Support: | yes |
| Device: | DMC11 | Name: | XMB | CSR: | 760100* | Vector: | 310* | Support: | yes |
| Device: | DZ11 | Name: | TTC | CSR: | 760120* | Vector: | 320* | Support: | yes |
| Device: | DZ11 | Name: | TTD | CSR: | 760130* | Vector: | 330* | Support: | yes |
| Device: | DZ11 | Name: | TTE | CSR: | 760140* | Vector: | 340* | Support: | yes |

* Indicates a floating address.

This example illustrates the use of the CONFIGURE command to calculate the UNIBUS CSR and vector addresses. The support field in the display indicates whether Digital includes the supported driver for this device with the operating system.

For a description of floating addresses referred to in the example, see Appendix D.♦

CONNECT (VAX Only)

VAX

On VAX systems, creates I/O data base control blocks for additional devices. Also loads the appropriate driver if it is not currently loaded. This is usually used to add nonstandard devices and I/O drivers to a system. Requires the CMKRNL privilege.

On Alpha systems, use the SYSMAN command IO CONNECT.

Format

```
CONNECT device-name/[NO]ADAPTER=adapter-spec/CSR=aaaa/VECTOR=nn
CONNECT CONSOLE [/REMOTE]
```

Parameters

device-name

Specifies the name of the device for which control blocks are to be added to the I/O database, and has the format "devcu" which is the device-type, controller, unit. For example, LPA0 specifies the line printer (LP) on controller A at unit number 0. When specifying the device name, do not follow it with a colon (:).

CONSOLE

Loads and connects the console block storage device driver. The console device name is typically CSA1 but can vary depending on the system type.

Qualifiers

/ADAPTER=adapter-spec

/NOADAPTER

Specifies the nexus number (SBI arbitration line) or slot number of the adapter to which the device is connected. The nexus number can be found by using the SYSGEN command SHOW/ADAPTER or SHOW/BUS.

/NOADAPTER specifies that the I/O driver does not handle a physical device, rather it is a pseudo or test device driver.

Caution

Use caution with the CONNECT/ADAPTER=adapter-spec command; the system does not perform complete error checking. An incorrect vector address or misspelled device name, for example, can damage the I/O database and usually causes the system to fail. The *OpenVMS VAX Device Support Manual* has more information about loading device drivers and connecting devices.

/ADPUNIT=unit-number

Specifies the unit number of a device on the MASSBUS adapter. The unit number for a disk drive is the number of the plug on the drive. For magnetic tape drives, the unit number corresponds to the tape controller's number.

SYSGEN CONNECT (VAX Only)

/CSR=csr-addr

Specifies the UNIBUS address of the first addressable location on the controller (usually the status register) for the device. This qualifier must be specified for UNIBUS devices. For devices on multiple device boards (for example, the DMF32), the address must be the CSR address specified in the output of the CONFIGURE command. To specify the address in octal or hexadecimal, precede the address with %O or %X, respectively.

/CSR_OFFSET=value

For devices on multiple device boards, specifies the offset from the CSR address of the multiple device board to the CSR address for the specific device being connected. To specify the address in octal or hexadecimal, precede the address with %O or %X, respectively.

/DRIVERNAME=driver

Specifies the name of the driver as recorded in the prolog table. If the driver has not been loaded, the system acts as if the driver name is also the name of an executable image (file type .EXE) in the SYS\$LOADABLE_IMAGES directory and loads the driver. The driver name defaults to the first two characters of the device name concatenated with "DRIVER" (for example, LPDRIVER).

/MAXUNITS=max-unit-cnt

Specifies the maximum number of units the controller can support (that is, the number of UCB slots in the IDB). The default is the number specified in the prolog table of the driver, or 8 if the number is not specified in the prolog table.

/NUMVEC=vector-cnt

Specifies the number of interrupt vectors for the device. By default, the vector count is 1.

/REMOTE

Enables a remote diagnostic port for a second console or terminal connected to a VAX 8600.

/SYSIDHIGH=value

Specifies the high-order 16 bits of the 48-bit system identification number and must be 0. To specify the value in octal or hexadecimal, precede the value with %O or %X, respectively.

/SYSIDLOW=value

Specifies the low-order 32 bits of the 48-bit system identification number. The value must be identical to the DECnet node number. To specify the value in octal or hexadecimal, precede the value with %O or %X, respectively.

/VECTOR=vector-addr

Specifies the UNIBUS address of the interrupt vector for the device or the lowest vector, if more than one exists. This qualifier must be specified for UNIBUS devices. For devices on multiple device boards (for example, the DMF32), the address must be the interrupt vector address for the multiple device board specified in the output of the CONFIGURE command. To specify the address in octal or hexadecimal, precede the address with %O or %X, respectively.

/VECTOR_OFFSET=value

For devices on multiple device boards, specifies the offset from the interrupt vector address of the multiple device board to the interrupt vector address for the

specific device being connected. To specify the address in octal or hexadecimal, precede the address with %O or %X, respectively.

Examples

```
SYSGEN> CONNECT LPA0/ADAPTER=3/CSR=%0777514 -  
SYSGEN> /DRIVERNAME=LP2DRIVER/VECTOR=%0200
```

The command in this example connects the device named LPA0 to the driver named LP2DRIVER and loads the driver if it is not already loaded.

```
SYSGEN> CONNECT NET/NOADAPTER/DRIVER=NETDRIVER
```

The command in this example connects the device named NET to the driver NETDRIVER and loads the driver if it is not already loaded.

CREATE

Creates a file that can be used as a paging, swapping, or dump file. Normally, this command is used indirectly by executing the command procedure SYS\$UPDATE:SWAPFILES.

Format

CREATE file-spec

Parameter

file-spec

The name of the file to be created.

Qualifiers

/CONTIGUOUS
/NOCONTIGUOUS

Specifies that the created file is either to be contiguous (/CONTIGUOUS) or contiguous-best-try (/NOCONTIGUOUS). You must specify /NOCONTIGUOUS, which is the default, if you are creating a secondary page or swap file that spans volumes in a volume set.

/SIZE=block-count

Specifies the size in blocks of the file to be created.

DEINSTALL

Deinstalls a page or swap file. Requires CMKRNL privilege. Any file installed with the SYSGEN INSTALL command can be deinstalled.

If the specified file is being actively used by processes, this command simply marks the file as "deinstall pending". This prevents any new assignments or reservations to the file from occurring. When all outstanding references to the file have been removed, the deinstallation will complete.

Files in the deinstall pending state are identified in the SHOW MEMORY/FILES display.

SYSGEN DEINSTALL

Format

DEINSTALL file-spec

DEINSTALL/ALL

DEINSTALL/INDEX=n

Parameter

file-spec

Specifies the name of a file that is to be deinstalled as a page or swap file.

Qualifiers

/PAGEFILE

Specifies that the file to be deinstalled is a page file.

/SWAPFILE

Specifies that the file to be deinstalled is a swap file.

/ALL

Deinstalls all page and swap files currently installed on the system. This command is most useful during an orderly system shutdown procedure where all disk volumes are being dismounted.

No other parameters or qualifiers are allowed.

/INDEX=n

Deinstalls a page or swap file specified by page file index. The page file index is presented in the SHOW MEMORY/FILES/FULL display as "Paging File Number".

No other parameters or qualifiers are allowed.

Example

```
SYSGEN> DEINSTALL DRA1:[SYSEXE]PAGEFILE.SYS /PAGEFILE
```

DISABLE

Inhibits the checking that SYSGEN performs on parameter values. By default, range checking is enabled.

Format

DISABLE CHECKS

Parameters

None.

Qualifiers

None.

ENABLE

Requests that SYSGEN ensure that parameter values changed using the SET command remain in the allowable range. By default, the range checking is enabled.

Format

ENABLE CHECKS

Parameters

None.

Qualifiers

None.

INSTALL

Installs an additional page or swap file. Requires CMKRNL privilege.

Format

INSTALL file-spec

Parameter

file-spec

Specifies the name of a file that is to be installed as a page or swap file. This file can reside on any volume that is mounted /SYSTEM. The file should be contiguous for best performance.

Qualifiers

/PAGEFILE

Specifies that the file is to be installed as an additional page file. This page file will augment any page file installed during the boot process.

/SWAPFILE

Specifies that the file is to be installed as an additional swap file. This swap file will augment any swap file installed during the boot process.

Example

```
SYSGEN> INSTALL DRA1:[SYSEXE]PAGEFILE.SYS /PAGEFILE
```


SYSGEN LOAD (VAX Only)

LOAD (VAX Only)

VAX

On VAX systems, loads an I/O driver. On Alpha systems, use the SYSMAN command IO LOAD.

Use of the LOAD command requires the CMKRNL privilege.

Format

LOAD file-spec

Parameter

file-spec

Specifies the file specification of the driver image to be loaded. This parameter is required.

If the entire file specification is the same as that of a driver already loaded, no load takes place. If only the file name is the same as that of a driver already loaded (but the file specification is different), the driver specified replaces the driver previously specified; that is, the existing driver.

The default file type is .EXE.

Description

Refer to the *OpenVMS VAX Device Support Manual* for a complete description of the LOAD command.

Example

```
SYSGEN> LOAD SYS$SYSTEM:RTTDRIVER
```

The command in this example loads the standard driver for a remote terminal. ♦

MSCP (VAX Only)

VAX

On VAX systems, loads and starts the MSCP server.

This method of loading the MSCP server has been superseded by the SYSGEN parameter MSCP_LOAD. To load the MSCP server, set the MSCP_LOAD parameter to 1. Define the disks to be served with the MSCP_SERVE_ALL parameter. See Appendix C for descriptions of the MSCP parameters.

Format

MSCP ♦

RELOAD (VAX Only)

VAX

On VAX systems, replaces a loaded device driver with a new version.

Use of the RELOAD command requires the CMKRNL privilege.

Format

RELOAD file-spec

Parameter

file-spec

The file specification of the new driver image. The default file type is .EXE. The specified image is loaded and replaces any existing driver with the same file specification.

Qualifiers

None.

Description

Refer to the *OpenVMS VAX Device Support Manual* for a complete description of the RELOAD command.

Example

```
SYSGEN> RELOAD SYS$SYSTEM:RTTDRIVER
```

The command in this example reloads the remote terminal driver. ♦

SET

Assigns a value to a system parameter in the SYSGEN work area.

This command does not modify parameter files, the current system parameter file on disk, or the active system; for information on performing these modifications, see the WRITE command.

Format

SET parameter-name value

Parameters

parameter-name

Specifies the name of a system parameter. If you enter a period (.), it is interpreted as a request for the system parameter specified in the last SET or SHOW command. See the description of the SHOW [parameter] command for an example of the use of the period in place of a parameter name.

You can display the system parameters and request information on them with the SYSGEN command HELP PARAMETERS.

SYSGEN SET

value

Usually specifies an integer or the keyword DEFAULT. Integer values must be within the defined minimum and maximum values for the parameter unless the SYSGEN command DISABLE CHECKS was specified.

The keyword DEFAULT specifies the default value for the parameter. You can display the maximum, minimum, and default values for any parameter with the SYSGEN command SHOW [parameter].

You can specify values for certain SYSGEN parameters in hexadecimal or octal radices and for others as an ASCII string. To specify a value in octal or hexadecimal, precede the value with %O or %X, respectively. To specify a value in ASCII, enclose the value string in quotation marks (" ").

Qualifiers

None.

Examples

1. SYSGEN> SET PFCDEFAULT 20

The command in this example assigns a value of 20 to the PFCDEFAULT parameter.

2. SYSGEN> SET GBLSECTIONS DEFAULT

The command in this example assigns the default value (40) to the GBLSECTIONS parameter.

SET/OUTPUT

Establishes a file to be used for output during the session. By default the output is written to SYS\$OUTPUT, but you can use the SET/OUTPUT command to designate a disk file.

At any time you can direct the output back to SYS\$OUTPUT by using the SET /OUTPUT=SYS\$OUTPUT command.

Format

SET/OUTPUT[=] file-spec

Parameter

file-spec

The name of the output file. The default file type is .LIS. The equal sign (=) is optional.

Example

```
SYSGEN> SET/OUTPUT=PARAMS.LIS
SYSGEN> SHOW/ALL
SYSGEN> SHOW/SPECIAL
SYSGEN> EXIT
```

In this example, output is directed to the file PARAMS.LIS to capture a complete list of all the system parameters (including the SPECIAL parameters reserved for Digital use) and their values.

SET/STARTUP

Names the site-independent startup command procedure to be associated with a parameter file for subsequent bootstrap operations.

Format

SET/STARTUP file-spec

Parameter

file-spec

The file specification of a startup command procedure on the system disk (maximum of 31 characters). The initial site-independent startup command procedure (as named in the software distribution kit) is SYS\$SYSTEM:STARTUP.COM.

Example

```
SYSGEN> SET/STARTUP SYS$SYSTEM:XSTARTUP.COM
```

The command in this example assigns SYS\$SYSTEM:XSTARTUP.COM as the current site-independent startup command procedure.

SHARE (VAX Only)

VAX

On VAX systems, connects a processor to a multiport memory unit already initialized by this or another processor. The number and name of the specified multiport memory unit must be those of an initialized unit, or an error condition results.

Use of the SHARE command requires the CMKRNL privilege.

Format

SHARE MPMn MPM-name

Parameters

MPMn

Specifies the number on the front panel of the multiport memory unit being connected.

SYSGEN SHARE (VAX Only)

MPM-name

Specifies the name of the multiport memory unit as indicated in a previous SHARE/INITIALIZE command.

Qualifiers

/MAXCEFCLUSTERS=max-cef

Specifies the maximum number of common event flag clusters that the processor can create in the multiport memory unit. The default is no limit.

/MAXGBLSECTIONS=max-gbl

Specifies the maximum number of global sections that the processor can create in the multiport memory unit. The default is no limit.

/MAXMAILBOXES=max-mail

Specifies the maximum number of mailboxes the processor can create in the multiport memory unit. The default is no limit.

Example

```
SYSGEN> SHARE MPM1 SHR_MEM_1
```

The command in this example connects a multiport memory unit. Because no qualifiers are specified, defaults apply to all the parameters.

The unit with a 1 on the front panel must be initialized with the name SHR_MEM_1 for the command to work. ♦

SHARE/INITIALIZE (VAX Only)

VAX

On VAX systems, initializes a multiport memory unit and connects it to the processor on which SYSGEN is running.

Use of the SHARE/INITIALIZE command requires the CMKRNL privilege.

Format

```
SHARE/INITIALIZE MPMn MPM-name
```

Parameters

MPMn

Specifies the number on the front panel of the multiport memory unit being connected.

MPM-name

Specifies the name by which the multiport memory unit is to be known to systems using it. The MPM-name is a 1 to 15 alphanumeric character string that may contain dollar signs (\$) and underscores (_).

Qualifiers

/CEFCLUSTERS=cef

Specifies the total number of common event flag clusters permitted in the multiport memory unit. The cef value is an integer with a default of 32.

/GBLSECTIONS=gbt

Specifies the total number of global sections permitted in the multiport memory unit. The gbt value is an integer with a default of 32.

/MAILBOXES=mail

Specifies the total number of mailboxes permitted in the multiport memory unit. The mail value is an integer with a default of 32.

/MAXCEFCLUSTERS=max-cef

Specifies the maximum number of common event flag clusters that the processor can create in the multiport memory unit. The default is no limit.

/MAXGBLSECTIONS=max-gbt

Specifies the maximum number of global sections that the processor can create in the multiport memory unit. The default is no limit.

/MAXMAILBOXES=max-mail

Specifies the maximum number of mailboxes the processor can create in the multiport memory unit. The default is no limit.

/POOLBCOUNT=block-cnt

Specifies the number of blocks allocated to the multiport memory unit's dynamic pool. The block-cnt value is an integer with a default of 128.

/POOLBSIZE=block-size

Specifies the size of each block in the dynamic pool. The block-size value is an integer with a default of 128 bytes.

/PRQCOUNT=prq-cnt

Specifies the number of interprocessor request blocks (PRQs) allocated. The prq-cnt value is an integer with a default of 64.

Description

If the specified multiport memory unit is already initialized and connected to other active processors, the gbt, mail, cef, block-cnt, block-size, and prq-cnt parameter values are ignored, and the unit is simply connected to the processor.

Example

```
SYSGEN> SHARE MPM1 SHR_MEM_1/INITIALIZE -  
SYSGEN> /GBLSECTIONS=128/MAILBOXES=64/CEFCLUSTERS=0
```

The command in this example initializes a multiport memory unit with defaults on all but the gbt, mail, and cef parameters. In this example, assume that the number of the multiport memory unit as it appears on the front panel is 1, and the unit name is SHR_MEM_1. ♦

SYSGEN

SHOW [parameter]

SHOW [parameter]

Displays the values of system parameters in the SYSGEN work area, plus the default, minimum, and maximum values of the parameters and their units of measure.

Format

SHOW [parameter-name]

Parameter

parameter-name

Specifies the name of a system parameter. If you enter a period (.), it is interpreted as a request for the system parameter specified in the last SET parameter-name or SHOW [parameter] command.

Qualifiers

/ACP

Specifies that all ACP parameter values are displayed.

/ALL

Specifies that all parameter values other than SPECIAL parameter values are displayed.

/BI

Specifies that device addresses that are currently mapped in the I/O space for the VAXBI bus are displayed.

/CLUSTER

Specifies that all CLUSTER parameter values are displayed.

/DYNAMIC

Specifies that all DYNAMIC parameter values are displayed.

/GEN

Specifies that all GEN parameter values are displayed.

/HEX

Specifies that the values of parameters be displayed in hexadecimal representation. Specify the /HEX system parameter name or the parameter type. If you specify the /HEX qualifier with the /NAMES qualifier, /HEX is ignored.

/JOB

Specifies that all JOB parameter values are displayed.

/LGI

Specifies that all LGI parameter values are displayed.

/MAJOR

Specifies that all MAJOR parameter values are displayed.

/MULTIPROCESSING

Specifies that all MULTIPROCESSING parameters are displayed.

/NAMES

Specifies that the names of all parameters are displayed.

/PQL

Specifies that all PQL parameter values are displayed.

/RMS

Specifies that all RMS parameter values are displayed.

/SCS

Specifies that all SCS parameter values are displayed.

/SPECIAL

Specifies that all parameter values reserved for Digital use are displayed.

/STARTUP

Specifies that the name of the current site-independent startup command procedure is displayed.

/SYS

Specifies that all SYS parameter values are displayed.

/TTY

Specifies that all terminal parameter values are displayed.

/XMI[=BIindex]

Specifies that device addresses that are currently mapped in the I/O space for the XMI bus are displayed. The /XMI qualifier also displays node and nexus numbers and generic names of all processors, adapters, VAXBI adapters, memory controllers, and interconnection devices such as the NI.

Use of the SHOW/XMI=BIindex command requires the CMEXEC privilege.

Description

Parameter values are displayed in decimal unless the /HEX qualifier is specified. Note that ASCII values are displayed in ASCII by default.

When parameter names are abbreviated, the first parameter matching the abbreviation is selected for display. No ambiguity checks are made. For example, a specification of SHOW GBL displays the GBLSECTIONS parameter. To display the GBLPAGFIL parameter, you must specify SHOW GBLPAGF (to avoid further ambiguity with the GBLPAGES parameter).

You can enter a period (.) to indicate that you want to work with the system parameter that was specified in the last SET parameter-name or SHOW [parameter] command.

Examples

```
1. SYSGEN> SHOW GBLSECTIONS
   GBLSECTIONS      100      40      20      -1 Sections
   SYSGEN> SET . 110
   SYSGEN> SHOW .
   GBLSECTIONS      110      40      20      -1 Sections
```

In this example, the user first displays the values of the GBLSECTIONS parameter and then refers to the parameter with a period to set its current

SYSGEN

SHOW [parameter]

value to 110. The next SHOW command also uses the period notation to obtain confirmation that the change occurred.

2. SYSGEN> SHOW/ACP

VAX

On a VAX system, the command in this example produces the following output:

Parameters in use: Active

| Parameter Name | Current | Default | Minimum | Maximum | Unit | Dynamic |
|----------------|---------|---------|---------|---------|-------------|---------|
| ACP_MULTIPLE | 0 | 1 | 0 | 1 | Boolean | D |
| ACP_SHARE | 1 | 1 | 0 | 1 | Boolean | |
| ACP_MAPCACHE | 52 | 8 | 1 | -1 | Pages | D |
| ACP_HDRCACHE | 138 | 128 | 2 | -1 | Pages | D |
| ACP_DIRCACHE | 138 | 80 | 2 | -1 | Pages | D |
| ACP_DINDXCACHE | 37 | 25 | 2 | -1 | Pages | D |
| ACP_WORKSET | 0 | 0 | 0 | -1 | Pages | D |
| ACP_FIDCACHE | 64 | 64 | 0 | -1 | File-Ids | D |
| ACP_EXTCACHE | 64 | 64 | 0 | -1 | Extents | D |
| ACP_EXTLIMIT | 300 | 300 | 0 | 1000 | Percent/10 | D |
| ACP_QUOCACHE | 130 | 64 | 0 | -1 | Users | D |
| ACP_SYSACC | 4 | 8 | 0 | -1 | Directories | D |
| ACP_MAXREAD | 32 | 32 | 1 | 64 | Blocks | D |
| ACP_WINDOW | 7 | 7 | 1 | -1 | Pointers | D |
| ACP_WRITEBACK | 1 | 1 | 0 | 1 | Boolean | D |
| ACP_DATACHECK | 2 | 2 | 0 | 3 | Bit-mask | D |
| ACP_BASEPRIO | 8 | 8 | 4 | 31 | Priority | D |
| ACP_SWAPFLGS | 14 | 15 | 0 | 15 | Bit-mask | D |
| ACP_XQP_RES | 1 | 1 | 0 | 1 | Boolean | |
| ACP_REBLDSYSD | 0 | 1 | 0 | 1 | Boolean | ◆ |

3. SYSGEN> SHOW/ACP/HEX

The command in this example produces a hexadecimal display of the values of the ACP system parameters, as follows:

Parameters in use: Active

| Parameter Name | Current | Default | Minimum | Maximum | Unit | Dynamic |
|----------------|----------|----------|----------|----------|-------------|---------|
| ACP_MULTIPLE | 00000000 | 00000001 | 00000000 | 00000001 | Boolean | D |
| ACP_SHARE | 00000001 | 00000001 | 00000000 | 00000001 | Boolean | |
| ACP_MAPCACHE | 00000034 | 00000008 | 00000001 | FFFFFFFF | Pages | D |
| ACP_HDRCACHE | 0000008A | 00000080 | 00000002 | FFFFFFFF | Pages | D |
| ACP_DIRCACHE | 0000008A | 00000050 | 00000002 | FFFFFFFF | Pages | D |
| ACP_DNDXCACHE | 00000025 | 00000019 | 00000002 | FFFFFFFF | Pages | D |
| ACP_WORKSET | 00000000 | 00000000 | 00000000 | FFFFFFFF | Pages | D |
| ACP_FIDCACHE | 00000040 | 00000040 | 00000000 | FFFFFFFF | File-Ids | D |
| ACP_EXTCACHE | 00000040 | 00000040 | 00000000 | FFFFFFFF | Extents | D |
| ACP_EXTLIMIT | 0000012C | 0000012C | 00000000 | 000003E8 | Percent/10 | D |
| ACP_QUOCACHE | 00000082 | 00000040 | 00000000 | FFFFFFFF | Users | D |
| ACP_SYSACC | 00000004 | 00000008 | 00000000 | FFFFFFFF | Directories | D |
| ACP_MAXREAD | 00000020 | 00000020 | 00000001 | 00000040 | Blocks | D |
| ACP_WINDOW | 00000007 | 00000007 | 00000001 | FFFFFFFF | Pointers | D |
| ACP_WRITEBACK | 00000001 | 00000001 | 00000000 | 00000001 | Boolean | D |
| ACP_DATACHECK | 00000002 | 00000002 | 00000000 | 00000003 | Bit-mask | D |
| ACP_BASEPRIO | 00000008 | 00000008 | 00000004 | 0000001F | Priority | D |
| ACP_SWAPFLGS | 0000000E | 0000000F | 00000000 | 0000000F | Bit-mask | D |
| ACP_XQP_RES | 00000001 | 00000001 | 00000000 | 00000001 | Boolean | |
| ACP_REBLDSYSD | 00000000 | 00000001 | 00000000 | 00000001 | Boolean | |

4. SYSGEN> SHOW/PQL

Alpha

On an Alpha system, the command in this example produces the following output:

Parameters in use: Active

| Parameter Name | Current | Default | Min. | Max. | Unit | Dynamic |
|----------------|---------|---------|------|------|-----------|---------|
| PQL_DASTLM | 24 | 24 | -1 | -1 | Ast | D |
| PQL_MASTLM | 4 | 4 | -1 | -1 | Ast | D |
| PQL_DBIOLM | 32 | 32 | -1 | -1 | I/O | D |
| PQL_MBIOLM | 4 | 4 | -1 | -1 | I/O | D |
| PQL_DBYTLM | 65536 | 65536 | -1 | -1 | Bytes | D |
| PQL_MBYTLM | 1024 | 1024 | -1 | -1 | Bytes | D |
| PQL_DCPULM | 0 | 0 | -1 | -1 | 10Ms | D |
| PQL_MCPULM | 0 | 0 | -1 | -1 | 10Ms | D |
| PQL_DDIOLM | 32 | 32 | -1 | -1 | I/O | D |
| PQL_MDIOLM | 4 | 4 | -1 | -1 | I/O | D |
| PQL_DFILLM | 128 | 128 | -1 | -1 | Files | D |
| PQL_MFILLM | 2 | 2 | -1 | -1 | Files | D |
| PQL_DPGFLQUOTA | 65536 | 65536 | -1 | -1 | Pagelets | D |
| internal value | 4096 | 4096 | 0 | -1 | Pages | D |
| PQL_MPGFLQUOTA | 2048 | 2048 | -1 | -1 | Pagelets | D |
| internal value | 128 | 128 | 128 | -1 | Pages | D |
| PQL_DPRCLM | 32 | 32 | -1 | -1 | Processes | D |
| PQL_MPRCLM | 0 | 0 | -1 | -1 | Processes | D |
| PQL_DTQELM | 16 | 16 | -1 | -1 | Timers | D |
| PQL_MTQELM | 0 | 0 | -1 | -1 | Timers | D |
| PQL_DWSDEFAULT | 2000 | 2000 | -1 | -1 | Pagelets | |
| internal value | 125 | 125 | 0 | -1 | Pages | |
| PQL_MWSDEFAULT | 2000 | 2000 | -1 | -1 | Pagelets | |
| internal value | 125 | 125 | 125 | -1 | Pages | |
| PQL_DWSQUOTA | 4000 | 4000 | -1 | -1 | Pagelets | D |
| internal value | 250 | 250 | 0 | -1 | Pages | D |
| PQL_MWSQUOTA | 4000 | 4000 | -1 | -1 | Pagelets | D |
| internal value | 250 | 250 | 250 | -1 | Pages | D |
| PQL_DWSEXTENT | 12000 | 12000 | -1 | -1 | Pagelets | D |
| internal value | 750 | 750 | 0 | -1 | Pages | D |
| PQL_MWSEXTENT | 4000 | 4000 | -1 | -1 | Pagelets | D |
| internal value | 250 | 250 | 250 | -1 | Pages | D |
| PQL_DENQLM | 64 | 64 | -1 | -1 | Locks | D |
| PQL_MENQLM | 4 | 4 | -1 | -1 | Locks | D |
| PQL_DJTQUOTA | 1024 | 1024 | -1 | -1 | Bytes | D |
| PQL_MJTQUOTA | 0 | 0 | -1 | -1 | Bytes | D ♦ |

SHOW/ADAPTER (VAX Only)

VAX

On VAX systems, displays all the nexus numbers and generic names on the adapter.

Use of the SHOW/ADAPTER command requires the CMEXEC privilege.

Format

SHOW/ADAPTER

Parameters

None.

SYSGEN SHOW/ADAPTER (VAX Only)

Qualifiers

None.

Example

```
SYSGEN> SHOW/ADAPTER
```

The following is a sample display produced by the SYSGEN SHOW/ADAPTER command:

CPU Type: 11/780

| | Nexus | Generic Name or Description |
|--|-------|-----------------------------|
| | 1 | 16K memory, non-interleaved |
| | 3 | UB0 |
| | 8 | MB0 |
| | 9 | MB1 ♦ |

SHOW/BUS (VAX Only)

VAX

On VAX systems, displays all the nexus numbers and generic names on the adapter. On Alpha systems, use the SYSMAN command IO SHOW BUS.

Use of the SHOW/BUS command requires the CMEXEC privilege.

Format

SHOW/BUS

Parameters

None.

Qualifiers

None.

♦

SHOW/CONFIGURATION (VAX Only)

VAX

On VAX systems, displays information on the device configuration.

Use of the SHOW/CONFIGURATION command requires the CMEXEC privilege.

Format

SHOW/CONFIGURATION

Parameters

None.

Qualifiers

/ADAPTER=nexus

Specifies the number of MASSBUS or UNIBUS adapters to be displayed. The nexus value can be expressed as an integer or with one of the generic names listed by the SYSGEN command SHOW/ADAPTER.

/COMMAND_FILE

Specifies that SYSGEN formats all the device data into CONNECT/ADAPTER=adapter-spec commands and writes the commands in an output file you specify. In this way, you can completely reconfigure a system for UNIBUS devices without the use of the SYSGEN command AUTOCONFIGURE.

/OUTPUT=file-spec

Specifies the file specification of an optional output file. If you specify the /OUTPUT qualifier but omit the file type, the default is .LIS. However, if you specify the /COMMAND_FILE and /OUTPUT qualifiers together, the default file type for the output file is .COM.

Description

The SHOW/CONFIGURATION command shows devices by name, number of units, nexus number, and adapter type, as well as by CSR and vector addresses. You can specify an output file with the /OUTPUT qualifier.

Note that you can remove a device from the middle of the floating addresses without completely redoing jumpers to the CSR and vector addresses of the remaining devices by following these steps:

1. Modify your site-independent STARTUP.COM file to invoke the command file specified with the /OUTPUT qualifier instead of entering an AUTOCONFIGURE ALL command.
2. Enter the SHOW/CONFIGURATION/COMMAND_FILE/OUTPUT command to format and save the device data. If you must bring the system down for service and remove a board, SYS\$SYSTEM:STARTUP.COM invokes your output file as a command procedure when the system reboots, and the system automatically configures UNIBUS devices and MASSBUS devices for you.

Remember that a new version of SYS\$SYSTEM:STARTUP.COM is provided with each major release, so you would need to repeat any modifications you have made to SYS\$SYSTEM:STARTUP.COM after you install the new version.

Note

Although this technique can offer a convenient short-term solution, use AUTOCONFIGURE ALL when possible.

SYSGEN

SHOW/CONFIGURATION (VAX Only)

Examples

1. SYSGEN> SHOW/CONFIGURATION

The command in this example displays the current system I/O database. The following illustrates a typical display produced by this command:

System CSR and Vectors on 15-JUN-1994 13:49:26.84

| | | | | | | |
|-----------|----------|----------|-------|-------------|--------------|--------------|
| Name: DRA | Units: 3 | Nexus: 4 | (MBA) | | | |
| Name: DBA | Units: 1 | Nexus: 4 | (MBA) | | | |
| Name: DBB | Units: 2 | Nexus: 5 | (MBA) | | | |
| Name: DRB | Units: 1 | Nexus: 5 | (MBA) | | | |
| Name: MTA | Units: 2 | Nexus: 5 | (MBA) | | | |
| Name: DMA | Units: 2 | Nexus: 8 | (UBA) | CSR: 777440 | Vector1: 210 | Vector2: 000 |
| Name: LPA | Units: 1 | Nexus: 8 | (UBA) | CSR: 777514 | Vector1: 200 | Vector2: 000 |
| Name: DYA | Units: 2 | Nexus: 8 | (UBA) | CSR: 777170 | Vector1: 264 | Vector2: 000 |
| Name: XMA | Units: 1 | Nexus: 8 | (UBA) | CSR: 760070 | Vector1: 300 | Vector2: 304 |
| Name: XMB | Units: 1 | Nexus: 8 | (UBA) | CSR: 760100 | Vector1: 310 | Vector2: 314 |
| Name: XMC | Units: 1 | Nexus: 8 | (UBA) | CSR: 760110 | Vector1: 320 | Vector2: 324 |
| Name: TTA | Units: 8 | Nexus: 8 | (UBA) | CSR: 760130 | Vector1: 330 | Vector2: 334 |
| Name: TTB | Units: 8 | Nexus: 8 | (UBA) | CSR: 760140 | Vector1: 340 | Vector2: 344 |
| Name: TTC | Units: 8 | Nexus: 8 | (UBA) | CSR: 760150 | Vector1: 350 | Vector2: 354 |
| Name: TTD | Units: 8 | Nexus: 8 | (UBA) | CSR: 760160 | Vector1: 360 | Vector2: 364 |
| Name: TTE | Units: 8 | Nexus: 8 | (UBA) | CSR: 760170 | Vector1: 370 | Vector2: 374 |
| Name: TTF | Units: 8 | Nexus: 8 | (UBA) | CSR: 760200 | Vector1: 400 | Vector2: 404 |

2. SYSGEN> SHOW/CONFIGURATION/COMMAND_FILE/OUTPUT=CONFIG.COM

The command in this example formats all device data into CONNECT /ADAPTER=adapter-spec commands and writes the commands to the command file CONFIG.COM. The following is a typical command file produced by this command:

```
$ RUN SYSSYSTEM:SYSGEN
AUTOCONFIGURE 4
AUTOCONFIGURE 5
CONNECT DMA0 /ADAP=8 /CSR=%0777440 /VECT=%0210 /NUMV=01 /DRIVER=DMDRIVER
CONNECT DMA1 /ADAP=8 /CSR=%0777440 /VECT=%0210 /NUMV=01 /DRIVER=DMDRIVER
CONNECT LPA0 /ADAP=8 /CSR=%0777514 /VECT=%0200 /NUMV=01 /DRIVER=LPDRIVER
CONNECT DYA0 /ADAP=8 /CSR=%0777170 /VECT=%0264 /NUMV=01 /DRIVER=DYDRIVER
CONNECT DYA1 /ADAP=8 /CSR=%0777170 /VECT=%0264 /NUMV=01 /DRIVER=DYDRIVER
CONNECT XMA0 /ADAP=8 /CSR=%0760070 /VECT=%0300 /NUMV=02 /DRIVER=XMDRIVER
CONNECT XMB0 /ADAP=8 /CSR=%0760100 /VECT=%0310 /NUMV=02 /DRIVER=XMDRIVER
CONNECT XMC0 /ADAP=8 /CSR=%0760110 /VECT=%0320 /NUMV=02 /DRIVER=XMDRIVER
CONNECT TTA0 /ADAP=8 /CSR=%0760130 /VECT=%0330 /NUMV=02 /DRIVER=DZDRIVER
CONNECT TTA1 /ADAP=8 /CSR=%0760130 /VECT=%0330 /NUMV=02 /DRIVER=DZDRIVER
CONNECT TTA2 /ADAP=8 /CSR=%0760130 /VECT=%0330 /NUMV=02 /DRIVER=DZDRIVER
.
.
CONNECT TTF7 /ADAP=8 /CSR=%0760200 /VECT=%0400 /NUMV=02 /DRIVER=DZDRIVER◆
```


SHOW/DEVICE (VAX Only)

VAX

On VAX systems, displays full information on device drivers loaded into the system, the devices connected to them, and their I/O databases. All addresses are in hexadecimal and are virtual. On Alpha systems, use the SYSMAN command IO SHOW DEVICE.

Use of the SHOW/DEVICE command requires the CMEXEC privilege.

Format

SHOW/DEVICE=device-driver

Parameters

None.

Qualifiers

None.

Description

The SHOW/DEVICE command specifies that the following information be displayed about the specified device driver:

| | |
|--------|--|
| Driver | Name of the driver |
| Start | Starting address of the driver |
| End | Ending address of the driver |
| Dev | Name of each device connected to the driver |
| DDB | Address of the device's device data block |
| CRB | Address of the device's channel request block |
| IDB | Address of the device's interrupt dispatch block |
| Unit | Number of each unit on the device |
| UCB | Address of each unit's unit control block |

By default, if you omit the driver name, information is displayed for all device drivers loaded into the system.

Example

```
SYSGEN> SHOW/DEVICE=DBDRIVER
```

The command in this example displays the following information about the DBDRIVER:

| Driver | Start | End | Dev | DDB | CRB | IDB | Unit | UCB |
|----------|----------|----------|-----|----------|----------|----------|------|-------------|
| DBDRIVER | 80082390 | 80082A7E | | | | | | |
| | | | DBA | 80000848 | 800988C0 | 80098920 | | |
| | | | | | | | 0 | 8000087C |
| | | | | | | | 1 | 8008A4F0 |
| | | | | | | | 2 | 8008A590 |
| | | | | | | | 5 | 8008A630 |
| | | | | | | | 7 | 8008A6D00 ♦ |

SHOW/DRIVER (VAX Only)

VAX

On VAX systems, displays the starting and ending address of the specified device driver loaded into the system.

Format

SHOW/DRIVER=device-driver

Parameters

None.

Qualifiers

None.

Description

If you omit the driver name, SHOW/DRIVER displays the starting and ending address of all device drivers loaded into the system. All addresses are in hexadecimal and are virtual.

Use of the SHOW/DRIVER command requires the CMEXEC privilege.

The SHOW/DRIVER command displays the following information about the specified device driver:

| | |
|--------|---------------------------------------|
| Driver | Name of the device driver |
| Start | Starting address of the device driver |
| End | Ending address of the device driver |

Example

SYSGEN> SHOW/DRIVER

The command in this example displays the starting and ending addresses of all drivers, as follows:

| Driver | Start | End |
|-----------|----------|------------|
| RTTDRIVER | 800C1060 | 800C1960 |
| NETDRIVER | 800BAFD0 | 800BD4B0 |
| TMDRIVER | 800B3950 | 800B4BF0 |
| DRDRIVER | 800B2950 | 800B3290 |
| DDDRIVER | 800B1740 | 800B2060 |
| DLDRIVER | 800B0D10 | 800B15A0 |
| DMDRIVER | 800B0070 | 800B0990 |
| LCDRIVER | 800AFC50 | 800AFFB0 |
| YCDRIVER | 800AED20 | 800AF3E0 |
| XGDRIVER | 800AC3F0 | 800AE9E0 |
| XDDRIVER | 800AA5A0 | 800AC380 |
| DZDRIVER | 800A4F30 | 800A59B0 |
| XMDRIVER | 800A3E10 | 800A4A50 |
| DYDRIVER | 800A3300 | 800A3C30 |
| LPDRIVER | 800A2E90 | 800A3300 |
| DBDRIVER | 800DE7A0 | 800DEFB7 |
| TTDRIVER | 800DC770 | 800DE79B |
| OPERATOR | 80001650 | 80001F8B |
| NLDRIVER | 80001626 | 80001D20 |
| MBDRIVER | 800015FC | 80001CBE ♦ |

SHOW/STARTUP

Displays the name of the current site-independent startup command procedure.

Format

SHOW/STARTUP

Parameters

None.

Qualifiers

None.

Example

```
SYSGEN> SHOW/STARTUP
Startup command file = SYS$SYSTEM:STARTUP.COM
```

The command in this example displays the name of the site-independent startup command procedure.

SHOW/TURBOCHANNEL (VAX Only)

VAX

On VAX systems, displays the nexus number of a device on the TURBOchannel.

Format

SHOW/TURBOCHANNEL

SYSGEN SHOW/TURBOCHANNEL (VAX Only)

Parameters

None.

Qualifiers

None.

Example

```
SYSGEN> SHOW/TURBOCHANNEL
```

The following is a sample display produced by the SHOW/TURBOCHANNEL command:

| TURBOCHANNEL: | Device Name | Nexus Number | TC Slot |
|---------------|-------------|--------------|-----------|
| | PMAQT-AA | 00000000 | 00000001♦ |

SHOW/UNIBUS (VAX Only)

VAX

On VAX systems, displays the addresses in UNIBUS I/O space that can be addressed.

Use of the SHOW/UNIBUS command requires the CMKRNL privilege.

Format

SHOW/UNIBUS

Parameters

None.

Qualifier

/ADAPTER=nexus

Specifies that the address of the specified UNIBUS adapter is to be displayed. The nexus value specifies the number of the UNIBUS adapter. It can be expressed as an integer or as one of the names listed by the SYSGEN command SHOW/ADAPTER.

Description

The SHOW/UNIBUS command reads all device registers. For some controllers, the result might be reading a character out of a buffer or some other undesired action. Therefore, use the SHOW/UNIBUS command only when you debug a UNIBUS configuration. On a system with more than one UNIBUS adapter, the command shows only the address of the first UNIBUS adapter.

Note

Never use the SHOW/UNIBUS command on a running system. Use of this command is valid only during a conversational bootstrap.

Example

```
SYSGEN> SHOW/UNIBUS/ADAPTER=4
```

The command in this example displays the available addresses for nexus 4, as follows:

```
**UNIBUS map for nexus #4 on 30-JUN-1994 14:19:38.00 **
Address 760070 (8001F838) responds with value 9B6E (hex)
Address 760072 (8001F83A) responds with value 0340 (hex)
Address 760074 (8001F83C) responds with value 403C (hex)
Address 760076 (8001F83E) responds with value 0240 (hex)
Address 760100 (8001F840) responds with value 8000 (hex)
Address 760102 (8001F842) responds with value 0340 (hex)
Address 760104 (8001F844) responds with value 7DAC (hex)
Address 760106 (8001F846) responds with value 000A (hex)
Address 760110 (8001F848) responds with value 8000 (hex)
Address 760112 (8001F84A) responds with value 0340 (hex)
Address 760114 (8001F84C) responds with value AD5C (hex)
Address 760116 (8001F84E) responds with value 000A (hex)
Address 760130 (8001F858) responds with value 9B6E (hex)
Address 760132 (8001F85A) responds with value 030D (hex)
Address 760134 (8001F85C) responds with value FF00 (hex)
Address 760136 (8001F85E) responds with value CECE (hex)
Address 760140 (8001F860) responds with value 4060 (hex)
Address 760142 (8001F862) responds with value 0761 (hex)
Address 760144 (8001F864) responds with value FF00 (hex)
.
.
.♦
```

TERMINAL

Modifies the Ctrl/C, Ctrl/O, Ctrl/Y, and Ctrl/Z echo strings on a systemwide basis.

Format

TERMINAL/ECHO

Parameters

None.

Qualifiers

None.

Description

Before entering the **TERMINAL** command, edit the file **SYSGTTSTR.MSG** in **SYS\$EXAMPLES**. The file contains detailed instructions for the editing procedure.

When you enter the **TERMINAL** command after editing the file, the modifications you have specified are carried out.

USE

Initializes the SYSGEN work area with system parameter values and the name of the site-independent startup command procedure. You specify the source for both the parameter values and the procedure name. They can be retrieved from a parameter file, the current system parameter file on disk, the active system in memory, or the default list.

Existing values in the SYSGEN work area are overwritten.

Format

USE file-spec

Parameter

file-spec

The file specification of a system parameter file from which data is to be retrieved. The parameter file is either SYS\$SYSTEM:AUTOGEN.PAR or the name of a parameter file you created with the SYSGEN command WRITE. The default file type is .PAR.

In place of a file specification, you can specify one of the following keywords:

CURRENT

Specifies that source information is to be retrieved from the current system parameter file on disk.

ACTIVE

Specifies that source information is to be retrieved from the active system in memory.

DEFAULT

Specifies that source information is to be retrieved from the default list.

Qualifiers

None.

Example

```
SYSGEN> USE DEFAULT
```

The command in this example initializes the SYSGEN work area with parameter values that allow the operating system to boot on any standard configuration. The initial values of the SYSGEN work area when the utility is invoked are the active values.

WRITE

Writes the system parameter values and the name of the site-independent startup command procedure from the SYSGEN work area to either a parameter file, the current system parameter file on disk, or the active system in memory. (Only the dynamic parameter values are written to the active system.)

Use of the WRITE ACTIVE command requires the CMKRNL privilege. Use of the WRITE CURRENT command requires the SYSPRV privilege.

Format

WRITE file-spec

Parameter

file-spec

The file specification of a new parameter file to be created. The default file type is PAR.

In place of a file specification, you can specify one of the following keywords:

CURRENT

Specifies that source information is to be written to the current system parameter file on disk.

ACTIVE

Specifies that source information is to be written to the active system in memory.

DEFAULT

Specifies that source information is to be written to the default list.

Qualifiers

None.

Description

VAX

On VAX systems, the implementation of security auditing within SYSGEN has altered the reporting of modifications to the systems parameter file VAXVMSSYS.PAR. System managers can receive notification of a change to the file by setting up an access control list (ACL) on the file to signal such an event, as in the following example:

```
$ SET ACL/ACL=(ALARM=SECURITY,ACCESS=WRITE+FAILURE+SUCCESS) -
_$ SYS$SYSTEM:VAXVMSSYS.PAR
```

For more information about setting ACLs, see the *OpenVMS User's Manual* and the *OpenVMS VAX Guide to System Security*. ♦

Alpha

On Alpha systems, both the WRITE ACTIVE and WRITE CURRENT commands send a message to OPCOM and log the event. ♦

SYSGEN WRITE

Examples

1. SYSGEN> WRITE SYS\$SYSTEM:SPECIAL

The command in this example creates a new parameter specification file.

2. SYSGEN> WRITE CURRENT

VAX

On VAX systems, the command in this example modifies the current system parameter file on disk (SYS\$SYSTEM:VAXVMSSYS.PAR).♦

Alpha

On Alpha systems, the command in this example modifies the current system parameter file on disk (SYS\$SYSTEM:ALPHAVMSSYS.PAR).♦

System Management Utility

8

System Management Utility

SYSMAN Description

The System Management utility (SYSMAN) centralizes the management of nodes and VMScLuster environments. Rather than logging in to individual nodes and repeating a set of management tasks, SYSMAN enables you to define your management environment to be a particular node, a group of nodes, or a VMScLuster environment. With a management environment defined, you can perform system management tasks from your local node. SYSMAN executes these tasks on all nodes in the target environment.

Managing a system with SYSMAN is similar to the traditional management of an individual system because SYSMAN uses many of the same software tools. It can process most DCL commands, such as MOUNT, DEFINE, INITIALIZE, SET, and SHOW. It can also execute many OpenVMS system management utilities and command procedures, such as AUTHORIZE, AUTOGEN, and INSTALL.

SYSMAN also contains system management tools that let you perform the following tasks:

- Set disk quotas using DISKQUOTA commands.
- Load and unload licenses using LICENSE commands.
- Associate a terminal or port with a user name using the automatic login facility (ALF) commands.
- Modify or display System Generation utility (SYSGEN) parameters using PARAMETERS commands.
- Build site-specific startup procedures using STARTUP commands, which display or modify startup components of the OpenVMS operating system, site-specific programs, and layered products.
- Modify or display VMScLuster parameters using CONFIGURATION commands.
- Load system services using SYS_LOADABLE commands, which add and remove executive loaded images from the set of images loaded at boot time.
- On Alpha systems, connect devices, load device drivers, and display configuration information using IO commands.♦
- Shut down systems using SHUTDOWN NODE command.

Alpha

6.1 Defining Keys to Execute SYSMAN Commands

Instead of having to type lengthy command lines, SYSMAN enables you to define keys to execute SYSMAN commands. For example, you can define a key to execute a SET/ENVIRONMENT command as follows:

```
SYSMAN> DEFINE/KEY/TERMINATE
_Key name: KP0
_Translation: "SET ENVIRONMENT/NODE=(NODE21,NODE22,NODE23)"
```

Once the key is defined, you can press keypad 0, and SYSMAN executes the SET ENVIRONMENT command. Note that key definitions are lost each time that you exit from SYSMAN, unless you define them in the SYSMAN initialization file. (See Section 6.2 for more information about executing commands from an initialization file.)

6.2 Executing Commands from an Initialization File

You can create an initialization file that SYSMAN will use each time you invoke the utility. In the SYSMAN initialization file, you can perform tasks such as defining keys and setting the SYSMAN environment.

The default file specification for the SYSMAN initialization file is SYS\$LOGIN:SYSMANINI.INI. If you want your SYSMAN initialization file to have a different file specification, you must define the logical name SYSMANINI to point to the location of the file.

The following is a sample initialization file in which several keys are defined:

```
$ TYPE SYSMANINI.INI
DEFINE/KEY/TERMINATE KP0 "SET ENVIRONMENT/CLUSTER/NODE=(NODE21,NODE22,NODE23,NODE24) "
DEFINE/KEY/TERMINATE KP1 "CONFIGURATION SHOW TIME"
DEFINE/KEY/TERMINATE KP2 "SHOW PROFILE"
```

```
.
```

SYSMAN Usage Summary

The System Management utility (SYSMAN) centralizes system management, enabling you to manage nodes or VMSclusters from one location.

Format

RUN SYS\$SYSTEM:SYSMAN

Parameters

None.

Usage Summary

To invoke SYSMAN, enter the following command at the DCL prompt:

```
$ RUN SYS$SYSTEM:SYSMAN
```

SYSMAN displays the following prompt at which you can enter SYSMAN commands using the standard rules of DCL syntax:

```
SYSMAN>
```

As an alternative, you can enter the RSX command MCR, which expands to RUN SYS\$SYSTEM:

```
$ MCR SYSMAN
```

With the MCR command, you can invoke SYSMAN and supply a command in one command string. With any SYSMAN command invoked in this way (except SET ENVIRONMENT), SYSMAN executes the command string and exits. After executing a SET ENVIRONMENT command, the utility returns the SYSMAN> prompt.

To exit from SYSMAN and return to the DCL command level, enter the EXIT command at the SYSMAN> prompt or press Ctrl/Z.

Note

SYSMAN has the following restrictions:

- You must have the OPER privilege on the local node and authorization for the OPER or SETPRV privilege on any remote nodes in the management environment.

You must also have the privileges required by individual commands, as each command in this chapter describes. To determine which privileges are required for DCL commands or for system management utilities, refer to the *OpenVMS DCL Dictionary* or the appropriate utility reference part of this manual.

SYSMAN Usage Summary

- You cannot run SYSMAN from a batch job in any environment that requires a password.
 - Some DCL commands, such as SHOW SYSTEM/CLUSTER, SET CLUSTER/QUORUM, MOUNT/CLUSTER, and some forms of the REPLY command, operate clusterwide by design. These commands should not be run using SYSMAN, unless the environment has been set to a single node.
-

SYSMAN Commands

This section describes the SYSMAN commands and demonstrates their use. Table 6-1 summarizes each command as follows.

Table 6-1 SYSMAN Commands

| Command | Function |
|--|--|
| @ | Requests that SYSMAN read subsequent command input from the specified file or device. |
| ALF ADD | Adds a record to the automatic login facility (ALF) database. |
| ALF REMOVE | Deletes one or more records from the automatic login facility (ALF) database. |
| ALF SHOW | Displays one or more records from the automatic login facility (ALF) database. |
| ATTACH | Permits you to transfer control from your current process to the specified process in your job. |
| CONFIGURATION SET CLUSTER_AUTHORIZATION | Updates security data in a local area VMScluster. |
| CONFIGURATION SET TIME | Updates system time. |
| CONFIGURATION SHOW CLUSTER_ AUTHORIZATION | Displays VMScluster security data. |
| CONFIGURATION SHOW TIME | Displays current system time. |
| DEFINE/KEY | Defines a key to execute a SYSMAN command |
| DISKQUOTA ADD | Adds an entry to a disk quota file. |
| DISKQUOTA CREATE | Creates and enables a disk quota file for a volume that does not contain one. |
| DISKQUOTA DISABLE | Suspends disk quota operations on a volume. |
| DISKQUOTA ENABLE | Resumes disk quota operations on a volume. |
| DISKQUOTA MODIFY | Changes an entry in the quota file or adjusts the default quota and overdraft values. |
| DISKQUOTA REBUILD | Reconstructs the disk usage counts for all entries. |
| DISKQUOTA REMOVE | Removes an entry from a disk quota file. |
| DISKQUOTA SHOW | Displays disk quotas and usage counts. |
| DO | Executes a DCL command or DCL command procedure. |
| LICENSE LOAD | Activates a license that is registered in the LICENSE database. |
| LICENSE UNLOAD | Deactivates a license that is registered in the LICENSE database. |
| PARAMETERS USE | Initializes the current work area with system parameter values and the name of the site-independent command procedure. |
| PARAMETERS SHOW | Displays the values of system parameters in the work area, plus the default, minimum, and maximum values of the parameters and their units of measure. |
| PARAMETERS SET | Modifies the value of a system parameter in the work area. |

(continued on next page)

SYSMAN Commands

Table 6–1 (Cont.) SYSMAN Commands

| Command | Function |
|---------------------------|--|
| PARAMETERS WRITE | Writes the system parameter values and the name of the site-independent command procedure from the work area to a parameter file, the current system parameter file, or the active system in memory. |
| PARAMETERS ENABLE CHECKS | Ensures that range checks are in effect. Enables range checks after a PARAMETERS DISABLE CHECKS command. |
| PARAMETERS DISABLE CHECKS | Inhibits range checks on system parameter values specified in subsequent PARAMETERS SET commands. |
| SET ENVIRONMENT | Establishes a management context for subsequent SYSMAN commands. |
| SET PROFILE | Modifies the default device and directory and the current privileges for the current management environment, and allows you to set DCL verification for future DO commands. |
| SET TIMEOUT | Establishes the amount of time that SYSMAN waits for a node to respond. |
| EXIT | Terminates the SYSMAN session and returns control to the DCL command level. |
| HELP | Provides information on SYSMAN commands. |
| ‡ IO AUTOCONFIGURE | Automatically identifies and configures all hardware devices attached to a system. |
| ‡ IO CONNECT | Connects devices that not Digital and loads device drivers. |
| ‡ IO LOAD | Loads an I/O driver. |
| ‡ IO SET EXCLUDE | Sets the permanent exclusion list to be used when configuring devices automatically. |
| ‡ IO SET PREFIX | Sets the prefix used to build the IOGEN Configuration Building Module (ICBM) names. |
| ‡ IO SHOW BUS | Lists the system's buses, node numbers, bus names, TR numbers, and base CSR addresses on the system. |
| ‡ IO SHOW DEVICE | Displays information about devices, their drivers, and their I/O databases. |
| ‡ IO SHOW EXCLUDE | Displays the permanent exclusion list used in the autoconfiguration of devices. |
| ‡ IO SHOW PREFIX | Displays the current prefix list used to produce the IOGEN Configuration Building Module (ICBM) names. |
| SHOW ENVIRONMENT | Displays the current command context. |
| SHOW KEY | Displays key definitions. |
| SHOW PROFILE | Displays the default device and directory and the current privileges. |
| SHOW TIMEOUT | Displays the current timeout period. |
| SHUTDOWN NODE | Shuts down one or more nodes simultaneously with a single command line. |
| SPAWN | Creates a subprocess of the current process, where the context of the subprocess is copied from the current process. |

‡Alpha specific

(continued on next page)

Table 6-1 (Cont.) SYSMAN Commands

| Command | Function |
|----------------------|--|
| STARTUP ADD | Adds an executable file or command procedure to the startup database. |
| STARTUP DISABLE | Prevents a component of the startup database from executing on one or more nodes in the environment. |
| STARTUP ENABLE | Allows a component of the startup database to execute. |
| STARTUP MODIFY | Edits a record in the startup database describing how a startup component executes. |
| STARTUP REMOVE | Removes one or more components from the startup database. |
| STARTUP SET DATABASE | Determines the default database. |
| STARTUP SET OPTIONS | Displays startup status. |
| STARTUP SHOW | Displays the name of the current startup database or its contents. |
| SYS_LOADABLE ADD | Adds an executive loaded image to the set of images loaded at boot time. |
| SYS_LOADABLE REMOVE | Removes an executive loaded image from the set of images loaded at boot time. |

@ (Execute Procedure)

Requests that SYSMAN read subsequent command input from the specific file or device.

Format

@ filespec

Parameter**filespec**

Specifies either the input device or the command procedure you want to execute. The default file type is .COM. You cannot use wildcard characters in the file specification.

Description

Use the @ command to execute a command procedure containing SYSMAN commands. To execute the command procedure, invoke SYSMAN, place the @ command at the beginning of a command line, then specify the file name of the command procedure.

The command procedure can contain any valid SYSMAN command.

SYSMAN

@ (Execute Procedure)

Examples

```
1. $ CREATE ENV.COM
   SET ENVIRONMENT
   SHOW PROFILE Ctrl/Z
   $ MCR SYSMAN
   SYSMAN> @ENV.COM

%SYSMAN-I-DEFDIR, default directory on node -- SYS$SYSROOT:[SYSMGR]
%SYSMAN-I-DEFPRIV, default process privileges on node --
      CMKRNL
      CMEXEC
      SYSNAM
      .
      .
      .
      GRPPRV
      READALL
      SECURITY
SYSMAN>
```

This example shows how to create a command procedure that sets the **SYSMAN** environment to the local node, and displays the current profile. These commands execute when you enter the **@ENV.COM** command.

```
2. $ CREATE TIME.COM
   SET ENVIRONMENT/CLUSTER
   CONFIGURATION SHOW TIME Ctrl/Z
   $ MCR SYSMAN
   SYSMAN> @TIME

System time on node NODE23: 19-JUN-1994 13:32:19.45
System time on node NODE24: 19-JUN-1994 13:32:27.79
System time on node NODE25: 19-JUN-1994 13:32:58.66
```

This example shows how to create and execute a command procedure that shows the current date and time for all the nodes in the **VMScluster**.

ALF ADD

Adds a new record to the automatic login facility (ALF) database.

Requires read (R) and write (W) access to the **SYSALF** database (**SYS\$SYSTEM:SYSALF.DAT** by default).

Format

ALF ADD device user

Parameters

device

Specifies the terminal name or port name that you want to assign to a user name. The parameter **device** must be a terminal name if you do not specify qualifiers on the command line, and can be either a logical name or an abbreviated device name. This parameter accepts a maximum of 63 characters.

user

Specifies the user name of the account that you want to assign to a particular terminal or port.

Qualifiers

/TERMINAL (default)

Checks whether the device name you specified is a terminal on the target system. The parameter device can be a logical name or an abbreviated device name, which SYSMAN translates to a full device name.

/PORT

Checks whether the device name you specified is a valid port. If the port name contains special characters, such as a slash (/), or if it contains lowercase letters that you want to preserve, you must enclose the port name within quotation marks (" ").

Be aware that anything within quotation marks is written literally to the ALF database file. For example, if the actual port name contains uppercase letters as well as special characters, be sure to specify uppercase letters within the quotation marks. Otherwise, a mismatch will occur between the actual port name and what is specified in the SYSALF.DAT file.

/PROXY

Checks that the device name is in the NODE::USERNAME format.

/LOG

Displays the device names and user names as they are added to the ALF database.

Description

You can use the ALF ADD command to associate a terminal or port with a particular user name. This will enable certain users to log in to certain terminals or ports without specifying a user name.

The ALF ADD command adds a new record to the ALF database.

Example

```
SYSMAN> ALF ADD TTA3 JBERGERON
SYSMAN> ALF ADD "MN34C3/LC-1-2" FMARTIN /PORT
```

In this example, the first command assigns terminal TTA3 to user JBERGERON. The second command assigns port MN34C3/LC-1-2 to user FMARTIN.

ALF REMOVE

Removes one or more records from the ALF database.

Requires read (R) and write (W) access to the SYSALF database (SYS\$SYSTEM:SYSALF.DAT).

Format

ALF REMOVE device

SYSMAN

ALF REMOVE

Parameter

device

Specifies the terminal name or port name whose record you want to remove from ALF. You can use wildcard characters in the terminal name or port name. If you omit the wildcard character and SYSMAN finds more than one matching record, SYSMAN returns an error message and does not remove any records.

Note

Use caution when issuing the REMOVE command from Version 6.1 or lower systems to Version 6.2 or higher systems.

When you specify a device whose record you want to remove from the ALF database, be sure to use the correct format. Enter the ALF SHOW command to display the device name format. Include special characters such as underscores (`_`) and colons (`:`).

Qualifiers

/USERNAME=user

Enables you to remove a record in ALF by specifying a user name rather than a terminal name or port name. You can use wildcard characters with the /USERNAME qualifier.

/CONFIRM

Causes SYSMAN to display a message asking you to verify that you want to remove the record.

/LOG

Causes SYSMAN to display each device name and user name after it has been removed from the ALF database.

Description

The ALF REMOVE command removes one or more records from the ALF database.

Example

```
SYSMAN> ALF REMOVE TTA3:  
SYSMAN> ALF REMOVE /USERNAME=SMITHSON
```

In this example, the first command removes the record for terminal TTA3. The second command removes all records assigned to user name SMITHSON.

ALF SHOW

Displays one or more records in the ALF database.

Requires read (R) and write (W) access to the SYSALF database (SYS\$SYSTEM:SYSALF.DAT).

Format

ALF SHOW [device]

Parameter

[device]

Specifies the terminal name or port name whose record you want to display. You can use wildcard characters in the terminal name or port name.

Qualifiers

/USERNAME=user

Enables you to display the records held by the specified user. You can use wildcard characters with this qualifier.

/OUTPUT[=filespec]

Enables you to direct the output of the command to a file. If you do not include a file specification with this qualifier, SYSMAN writes the output to the file SYSMAN.LIS in your default directory.

Description

The ALF SHOW command displays one or more records in the ALF database.

Example

```
SYSMAN> ALF SHOW TTA* /USERNAME=MANESS /OUTPUT=ALF.TXT
```

In this example, the records for all terminals named TTAx that are assigned to user MANESS are selected and directed to the file ALF.TXT.

ATTACH

Transfers control from your current process (which then hibernates) to the specified process in your job.

The ATTACH and SPAWN commands cannot be used if your terminal has an associated mailbox.

Format

ATTACH [process-name]

SYSMAN ATTACH

Parameter

process-name

Specifies the name of a parent process or a spawned subprocess to which control passes. The process must already exist, be part of your current job tree, and share the same input stream as your current process. However, the process cannot be your current process or a subprocess created with the /NOWAIT qualifier.

Process names can contain from 1 to 15 alphanumeric characters. If a connection to the specified process cannot be made, an error message is displayed.

Qualifier

/PARENT

Enables you to attach to the parent process. If no parent process exists, you receive an error message.

Description

The ATTACH command enables you to connect your input stream to another process. You can use the ATTACH command to change control from one subprocess to another subprocess or to the parent process.

When you enter the ATTACH command, the parent process goes into hibernation and your input stream connects to the specified destination process. You can use the ATTACH command to connect to a subprocess that is part of a current job (left hibernating as a result of the SPAWN/WAIT command or another ATTACH command) as long as the connection is valid. No connection can be made to the current process, to a process that is not part of the current job, or to a process that does not exist. If you attempt any of these connections, you receive an error message.

You can also use the ATTACH command in conjunction with the SPAWN /WAIT command to return to a parent process without terminating the created subprocess. See the description of the SPAWN command for more details.

Example

```
$ SPAWN
%DCL-S-SPAWNED, process SYSTEM_1 spawned
%DCL-S-ATTACHED, terminal now attached to process SYSTEM_1
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> ATTACH SYSTEM
%DCL-S-RETURNED, control returned to process SYSTEM
$
```

In this example, the SPAWN command creates a subprocess (SYSTEM_1). After you invoke SYSMAN and enter the ATTACH command, you transfer the terminal's control back to the parent process (SYSTEM).

CONFIGURATION SET CLUSTER_AUTHORIZATION

Modifies security data in a local area VMScluster.

Requires SYSPRV privilege.

Format

CONFIGURATION SET CLUSTER_AUTHORIZATION

Parameters

None.

Qualifiers

/GROUP_NUMBER=[n]

Specifies the VMScluster group number that is recorded in SYS\$SYSTEM:CLUSTER_AUTHORIZE.DAT. A group number uniquely identifies each local area VMScluster configuration on a single Ethernet. This number must be in the range from 1 to 4095 or 61440 to 65535.

/PASSWORD=password

Specifies a password for VMScluster access. A password consists of 1 to 31 characters, including alphanumeric characters, dollar signs, and underscores. A password provides a second level of validation to ensure the integrity of individual VMSclusters on the same Ethernet that accidentally use identical group numbers. A password also prevents an intruder who discovers the group number from joining the VMScluster.

Description

The CONFIGURATION SET CLUSTER_AUTHORIZATION command modifies the group number and password of a local area VMScluster, as recorded in SYS\$SYSTEM:CLUSTER_AUTHORIZE.DAT. If your configuration has multiple system disks, SYSMAN automatically updates each copy of CLUSTER_AUTHORIZE.DAT, provided the environment is defined as a VMScluster (SET ENVIRONMENT/CLUSTER). For more information about CLUSTER_AUTHORIZE.DAT, see *VMScluster Systems for OpenVMS*.

Caution

If you change either the group number or the password, you must reboot the entire VMScluster.

The file CLUSTER_AUTHORIZE.DAT is initialized during execution of CLUSTER_CONFIG.COM and maintained through SYSMAN. Under normal conditions, altering records in the CLUSTER_AUTHORIZE.DAT file interactively is not necessary. To protect the integrity of the cluster membership use the CONFIGURATION SET CLUSTER_AUTHORIZATION command.

SYSMAN CONFIGURATION SET CLUSTER_AUTHORIZATION

Example

```
SYSMAN> SET ENVIRONMENT/CLUSTER/NODE=NODE21
SYSMAN> SET PROFILE /PRIVILEGE=SYSPRV
SYSMAN> CONFIGURATION SET CLUSTER_AUTHORIZATION/PASSWORD=GILLIAN
%SYSMAN-I-CAFOLDGROUP, existing group will not be changed
%SYSMAN-I-GRPNCHG, Group number not changed
SYSMAN-I-CAFREBOOT, cluster authorization file updated.
The entire cluster should be rebooted.
```

The CONFIGURATION SET CLUSTER_AUTHORIZATION command in this example sequence modifies the VMScLuster password. Note that the environment is defined to be a VMScLuster, and the SYSPRV privilege is established before entering the CONFIGURATION SET CLUSTER_AUTHORIZATION command.

CONFIGURATION SET TIME

Modifies the current system time.

Requires OPER and LOG_IO privilege, and in a VMScLuster environment, SYSLCK privilege.

Format

CONFIGURATION SET TIME [time]

Parameters

None.

Description

The CONFIGURATION SET TIME command enables you to reset the system time. Specify a time value using the following format:

[dd-mmm-yyyy[:]] [hh:mm:ss.cc]

You can also enter a delta time value. See the *OpenVMS User's Manual* for more information about time formats.

In an environment of individual nodes, SYSMAN sets the time to the specified value on each node. Without a time specification, SYSMAN sets the time according to the time-of-year clock on each node.

In a VMScLuster environment, SYSMAN sets the time to the specified value on each node. If you do not specify a value, SYSMAN uses the time-of-year clock. In a local VMScLuster, SYSMAN reads the clock on the node from which you are executing SYSMAN and assigns this value to all nodes in the VMScLuster. In a remote VMScLuster, SYSMAN reads the clock on the target node in the VMScLuster and assigns that value to all nodes. Note that the time-of-year clock is optional for some processors; see your processor handbook for further information.

SYSMAN uses special processing in a VMScLuster environment to ensure that all processors in the VMScLuster are set to the same time. Because of communication and processing delays, it is not possible to synchronize clocks exactly. However, the variation is typically less than a few hundredths of a second. If SYSMAN

cannot set the time to within one half second of the specified time, you receive a warning message that names the node that failed to respond quickly enough.

As a result of slight inaccuracies in each processor clock, times on various members of a VMSccluster tend to drift apart. The following procedure synchronizes system times in a VMSccluster environment:

```
$ SYNCH_CLOCKS:
$ RUN SYS$SYSTEM:SYSMAN
    SET ENVIRONMENT/CLUSTER
    CONFIGURATION SET TIME
    EXIT
$ WAIT 6:00:00
$ GOTO SYNCH_CLOCKS
```

The procedure sets the time on all VMSccluster nodes to the value obtained from the local time-of-year clock, waits 6 hours, then resets the time for the VMSccluster.

Example

```
SYSMAN> SET ENVIRONMENT/NODE=(NODE21,NODE22,NODE23)
SYSMAN> SET PROFILE /PRIVILEGE=LOG_IO
SYSMAN> CONFIGURATION SET TIME 12:38:00
```

The CONFIGURATION SET TIME command in this example sequence modifies the system time on NODE21, NODE22, and NODE23.

CONFIGURATION SHOW CLUSTER_AUTHORIZATION

Displays the group number and multicast address of a local area VMSccluster.

Requires SYSPRV privilege.

Format

CONFIGURATION SHOW CLUSTER_AUTHORIZATION

Parameters

None.

Qualifier

/OUTPUT[=filespec]

Redirects output from SYS\$OUTPUT to the specified file. If no file specification is provided, SYSMAN writes the output to SYSMAN.LIS in the current directory.

Description

The CONFIGURATION SHOW CLUSTER_AUTHORIZATION command displays the group number and multicast address, and Ethernet address used to send a message to all nodes in the VMSccluster. The group number and multicast address are recorded in SYS\$SYSTEM:CLUSTER_AUTHORIZE.DAT during the CLUSTER_CONFIG dialog.

SYSMAN CONFIGURATION SHOW CLUSTER_AUTHORIZATION

In a VMSccluster or multinode environment, SYSMAN displays the group number of the first node and then displays the names of any nodes in the cluster whose group numbers, passwords, or both, are different.

Example

```
SYSMAN> SET ENVIRONMENT/CLUSTER/NODE=NODE21
.
.
.
SYSMAN> SET PROFILE /PRIVILEGE=SYSPRV
SYSMAN> CONFIGURATION SHOW CLUSTER_AUTHORIZATION
Node NODE23: Cluster group number 65240
Multicast address: AB-00-04-01-F2-FF
```

The CONFIGURATION SHOW CLUSTER_AUTHORIZATION command in this example displays the group number and multicast address of NODE21. Because the group number and password on other nodes in the VMSccluster are identical, no further information is displayed.

CONFIGURATION SHOW TIME

Displays the current date and system time to the nearest hundredth of a second.

Format

CONFIGURATION SHOW TIME

Parameters

None.

Qualifier

/OUTPUT[=filespec]

Redirects output from SYS\$OUTPUT to the specified file. If no file specification is provided, SYSMAN writes the output to SYSMAN.LIS in the current directory.

Example

```
SYSMAN> SET ENVIRONMENT/CLUSTER/NODE=NODE21
.
.
.
SYSMAN> CONFIGURATION SHOW TIME
System time on node NODE21: 19-JUN-1994 13:32:19.45
System time on node NODE22: 19-JUN-1994 13:32:27.79
System time on node NODE23: 19-JUN-1994 13:32:58.66
```

The CONFIGURATION SHOW TIME command in this example displays the system times for all nodes in the VMSccluster.

DEFINE

Defines a key to execute a SYSMAN command. This enables you to press the key to enter a command, instead of typing the command name.

Format

DEFINE/KEY key-name string

Parameters

key-name

Specifies the name of the key you are defining. Use the key names in Table 6-2 when defining keys.

Table 6-2 Key Names in SYSMAN

| Key Name | VT100 | LK201/LK401 |
|-----------------------|------------|------------------------|
| PF1 | PF1 | PF1 |
| PF2 | PF2 | PF2 |
| PF3 | PF3 | PF3 |
| PF4 | PF4 | PF4 |
| KP0, KP1-KP9 | keypad 0-9 | keypad 0-9 |
| PERIOD | period key | period key |
| COMMA | comma key | comma key |
| MINUS | minus key | minus key |
| ENTER | ENTER key | ENTER key |
| UP, DOWN, LEFT, RIGHT | arrow keys | arrow keys |
| FIND, INSERT_HERE | - | Find, Insert Here keys |
| REMOVE, SELECT | - | Remove, Select keys |
| PREV_SCREEN | - | Previous Screen key |
| NEXT_SCREEN | - | Next Screen key |
| HELP, DO | - | Help, Do keys |
| F6-F10, F11-F14 | - | function keys |
| F17-F20 | - | function keys |

string

Specifies the string you want entered when you press the defined key. For example, you can define string as the SYSMAN command SHOW ENVIRONMENT or SHOW PROFILE.

Qualifiers

/ECHO (default)

/NOECHO

Specifies whether the command line echoes after you press the defined key. Note that you cannot define a key using both the /NOECHO and /NOTERMINATE qualifiers.

SYSMAN DEFINE

/IF_STATE=state_list

/NOIF_STATE

Specifies a list of states, any one of which must be set in order to enable the specified key definition. If you omit or negate this qualifier, the current state prevails.

/LOCK_STATE

/NOLOCK_STATE (default)

Retains the state specified by the /SET_STATE qualifier until you use the /SET_STATE qualifier again to change it.

/SET_STATE

/NOSET_STATE

Associates a state with the key you are defining. A state name can be any alphanumeric string. If you omit or negate this qualifier, the current state remains unchanged. You cannot define a key using both the /SET_STATE and /TERMINATE qualifiers.

/TERMINATE

/NOTERMINATE

Determines whether the specified command string executes when you press the key. When you use /NOTERMINATE, you must press the Return key to execute the command string. You cannot define a key using both the /SET_STATE and /TERMINATE qualifiers.

Description

The DEFINE/KEY command enables you to assign a key to a SYSMAN command. This enables you to execute the command by pressing the key. You can confirm which keys you have defined by using the SHOW KEY command.

When you exit from SYSMAN, any SYSMAN key definitions you established will be lost unless you define them in a SYSMAN initialization file. See Section 6.2.

Examples

1. SYSMAN> DEFINE /KEY PF1 "SHOW PROFILE"

This example shows how to define the keypad key PF1 as the SYSMAN command SHOW PROFILE. To execute the SHOW PROFILE command, press PF1 and then the Return key.

2. SYSMAN> DEFINE /KEY KP0 /TERMINATE "CONFIGURATION SHOW TIME"

This example shows how to define the keypad key 0 as the CONFIGURATION SHOW TIME command. The /TERMINATE qualifier causes the SYSMAN command to execute when you press keypad key 0 without having to press Return.

DISKQUOTA ADD

Adds an entry to a disk quota file and initializes the usage count to zero.

Requires write (W) access to the quota file.

Format

DISKQUOTA ADD owner

Parameter

owner

Specifies the user identification code (UIC) or rights identifier for which the quota entry is added. You can specify the UIC in numeric or alphanumeric format. For complete information on UIC specification, refer to the *OpenVMS AXP Guide to System Security*, or the *OpenVMS VAX Guide to System Security*, depending on your system.

Rights identifiers are granted with the Authorize utility and use an ID format rather than a UIC format. See the *OpenVMS Programming Concepts Manual* for a complete description of rights identifiers.

When working in nonlocal environments, be careful that the alphanumeric UIC or rights identifiers that you use are valid for the environment.

Qualifiers

/DEVICE=device-spec

Specifies the location of the quota file. SYSMAN validates the device specification. You can specify a logical name for device-spec. If you do, the logical name is translated in the target environment.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

/OVERDRAFT=value

Specifies a positive integer that provides an overdraft value for the specified UIC. If omitted, the overdraft value defaults to the overdraft value in the entry for [0,0].

/PERMQUOTA=value

Specifies a positive integer that provides the quota for the specified UIC. If omitted, the permanent quota defaults to the value of the quota in the entry for [0,0].

Description

The DISKQUOTA ADD command appends individual entries to a quota file on the specified disk. Note that the quota file must already exist and be enabled.

Unless you specify the permanent quota and overdraft values, SYSMAN applies the default values from the UIC entry [0,0]. You adjust UIC [0,0] with the DISKQUOTA MODIFY command.

SYSMAN DISKQUOTA ADD

Example

```
❶ SYSMAN> SET ENVIRONMENT/NODE=(NODE22,NODE21)
%SYSMAN-I-ENV, Current command environment:
    Individual nodes: NODE22,NODE21
    Username ALEXIS will be used on nonlocal nodes.
❷ SYSMAN> SET PROFILE /PRIVILEGE=SYSPRV
❸ SYSMAN> DISKQUOTA ADD [MKT,MORSE] /DEVICE=WORK1 -
SYSMAN> /PERMQQUOTA=200 /OVERDRAFT=50
❹ SYSMAN> DISKQUOTA ADD PAYROLL /DEVICE=WORK1 /PERMQQUOTA=1000
```

- ❶ Defines the management environment to be NODE22 and NODE21.
- ❷ Adds SYSPRV privilege to the user's current privileges in order to write to the quota file.
- ❸ Adds UIC [MKT,MORSE] to the quota file on the device named WORK1 on both NODE22 and NODE21, setting the permanent quota to 200 disk blocks and the overdraft limit to 50 disk blocks, for an absolute limit of 250 blocks.
- ❹ Adds an entry for the rights identifier PAYROLL. Any user holding the PAYROLL identifier can use this disk space.

DISKQUOTA CREATE

Creates and enables a quota file for a disk volume that does not currently contain one.

Requires write (W) access to the volume's master file directory (MFD), plus one of the following: SYSPRV privilege, a system UIC, or ownership of the volume.

Format

DISKQUOTA CREATE

Parameters

None.

Qualifier

/DEVICE=device-spec

Specifies the disk volume on which to create a quota file. SYSMAN validates the device specification. A logical name may be specified for device-spec. If so, it is translated in the target environment.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

Description

The DISKQUOTA CREATE command creates a quota file for a volume that does not currently have one.

Only one quota file, [000000]QUOTA.SYS, can be present on any volume or volume set. As soon as you create a quota file, establish default values for quotas and overdrafts by adjusting UIC [0,0] with the DISKQUOTA MODIFY command. When a disk has existing files, use the DISKQUOTA REBUILD command to have SYSMAN update the quota file to contain current usage values.

Note

Digital recommends that you do not create and enable a quota file on the system disk unless users are allowed to create files on that disk.

Example

```
SYSMAN> SHOW ENVIRONMENT
%SYSMAN-I-ENV, Current command environment:
      Node NODE24 of local cluster
      Username ALEXIS      will be used on nonlocal nodes
SYSMAN> DO SHOW DEVICES
.
.
.
SYSMAN> DISKQUOTA CREATE /DEVICE=DJA31:
SYSMAN> DISKQUOTA MODIFY /DEVICE=DJA31: [0,0] -
_SYSMAN> /PERMQOTA=10000 /OVERDRAFT=100
```

The commands in this example sequence display the characteristics of the current management environment and verify the device name. Then they create a quota file on the disk DJA31 and set up default quota values.

DISKQUOTA DELETE

Removes an entry from a quota file.

See the command DISKQUOTA REMOVE for more information. The DISKQUOTA REMOVE and DISKQUOTA DELETE commands perform the same function.

DISKQUOTA DISABLE

Suspends the maintenance and enforcement of disk quotas on a volume.

Requires SYSPRV privilege, a system UIC, or ownership of the volume.

Format

DISKQUOTA DISABLE

SYSMAN DISKQUOTA DISABLE

Parameters

None.

Qualifier

/DEVICE=device-spec

Specifies a disk volume on which to disable a quota file. SYSMAN validates the device specification. A logical name may be specified for device-spec. If so, it is translated in the target environment.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

Description

The DISKQUOTA DISABLE command suspends quota operations on a volume. To permanently disable quotas on a device, disable the quotas with the DISKQUOTA DISABLE command and delete the file [000000]QUOTA.SYS. Otherwise, the system implicitly enables quotas when the disk is mounted, leaving invalid quota information.

If you enable the quota file later, enter the DISKQUOTA REBUILD command to update UIC entries and usage counts.

Example

```
SYSMAN> SET ENVIRONMENT/NODE=AMANDA  
SYSMAN> DISKQUOTA DISABLE /DEVICE=DJA1:
```

The command in this example suspends quota enforcement on disk DJA1, located on node AMANDA.

DISKQUOTA ENABLE

Resumes quota enforcement on a disk volume.

Requires SYSPRV privilege, a system UIC, or ownership of the volume.

Format

DISKQUOTA ENABLE

Parameters

None.

Qualifier

/DEVICE=device-spec

Specifies a disk volume on which to enable the quota file. SYSMAN validates the device specification. A logical name may be specified for device-spec. If so, it is translated in the target environment.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

Description

The DISKQUOTA ENABLE command reinstates the enforcement of quotas on a volume that had been suspended with the DISKQUOTA DISABLE command. Whenever you enable quotas on a volume, use the DISKQUOTA REBUILD command to update UIC entries and usage counts.

Example

```
SYSMAN> SET ENVIRONMENT/NODE=NODE21
SYSMAN> SET PROFILE/DEFAULT=DJA12:[ALEXIS.MGR]
SYSMAN> DISKQUOTA ENABLE
SYSMAN> DISKQUOTA REBUILD
```

The command in this example resumes quota enforcement on the default disk DJA12, which is located on NODE21. The DISKQUOTA REBUILD command updates the quota file, correcting quotas and adding any new entries.

DISKQUOTA MODIFY

Changes an entry in a quota file or adjusts default values for quotas and overdrafts. If a new quota limit is less than the current usage count, SYSMAN issues a warning message before it implements the new quota.

Requires write (W) access to the quota file.

Format

DISKQUOTA MODIFY owner

Parameter

owner

Specifies the user identification code (UIC) or rights identifier. You can specify the UIC in numeric or alphanumeric format. For complete information on UIC specification, refer to the *OpenVMS AXP Guide to System Security*, or the *OpenVMS VAX Guide to System Security*, depending on your system.

Rights identifiers are granted with the Authorize utility and use an ID format rather than a UIC format. See the *OpenVMS Programming Concepts Manual* for a complete description of rights identifiers.

When working in nonlocal environments, make sure that the alphanumeric UIC or rights identifiers that you use are valid for the environment.

Qualifiers

/DEVICE=device-spec

Specifies the disk volume that contains the quota file. SYSMAN validates the device specification. A logical name may be specified for device-spec. If so, it is translated in the target environment.

SYSMAN DISKQUOTA MODIFY

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

/OVERDRAFT=value

Specifies a positive integer that provides an overdraft value for the specified UIC. If you omit a value, the overdraft value defaults to the overdraft value in the entry for [0,0].

/PERMQUOTA=value

Specifies a positive integer that provides the quota for the specified UIC. If you omit a value, the permanent quota defaults to the value of the quota in the entry for [0,0].

Description

The DISKQUOTA MODIFY command changes values in a quota file for the disk named in the device specification. If you establish a quota limit that is less than the current usage count, a user can still log in and out, but cannot create files.

After creating a quota file, use the DISKQUOTA MODIFY command to set default values for quotas and overdrafts. UIC [0,0] sets the default permanent quota and overdraft values for a quota file, so you must change the entry [0,0] to values appropriate for your installation. Unless you specify quota and overdraft values when adding a file entry, SYSMAN applies these defaults to UIC entries.

Examples

1. SYSMAN> SET ENVIRONMENT/NODE=NODE21
SYSMAN> DISKQUOTA MODIFY /DEVICE=DUA12: [0,0] -
_SYSMAN> /PERMQUOTA=3000 /OVERDRAFT=300

The command in this example edits the entry for UIC [0,0] in the quota file on DUA12, which is located on NODE21.

2. SYSMAN> DISKQUOTA MODIFY /DEVICE=SYS\$DISK1 [TTD,DAVIS] -
_SYSMAN> /PERMQUOTA=900

The command in this example sets the permanent quota for UIC [TTD,DAVIS] to 900 blocks, while making no change to the overdraft limit. SYSMAN modifies the quota file that is located on disk SYS\$DISK1 in the current environment.

DISKQUOTA REBUILD

Updates a quota file, adding new UICs and correcting usage counts for each user on the volume.

Requires write (W) access to the quota file, plus one of the following: SYSPRV privilege, a system UIC, or ownership of the volume.

Format

DISKQUOTA REBUILD

Parameters

None.

Qualifier

/DEVICE=device-spec

Specifies the disk volume that contains the quota file. SYSMAN validates the device specification and translates any logical name in the target environment before rebuilding the file.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

Description

The DISKQUOTA REBUILD command reads the disk, recalculates usage counts for all existing entries in QUOTA.SYS, and adds new entries. It sets quota and overdraft values to the defaults set in UIC [0,0] if the entry did not previously exist. While the DISKQUOTA REBUILD command is executing, file activity on the volume is frozen. No files can be created, deleted, extended, or truncated.

Use the DISKQUOTA REBUILD command in the following circumstances:

- After creating a quota file on a volume with existing files.
- When the quota file has been enabled after a period of being disabled. The command corrects the usage counts and adds any new UICs.

Example

```
SYSMAN> SET ENVIRONMENT /NODE=NODE21
SYSMAN> SET PROFILE /PRIVILEGE=SYSPRV
SYSMAN> DISKQUOTA ENABLE /DEVICE=DUA226:
SYSMAN> DISKQUOTA REBUILD /DEVICE=DUA226:
```

The command in this example enables the quota file and reconstructs the usage counts for all entries on disk DUA226, which is located on node NODE21.

DISKQUOTA REMOVE

Removes an entry from a quota file.

Requires write (W) access to the quota file.

Format

DISKQUOTA REMOVE owner

SYSMAN DISKQUOTA REMOVE

Parameter

owner

Specifies the user identification code (UIC) or rights identifier. You can specify the UIC in numeric or alphanumeric format. For complete information on UIC specification, refer to the *OpenVMS AXP Guide to System Security*, or the *OpenVMS VAX Guide to System Security*, depending on your system.

Rights identifiers are granted with the Authorize utility and use an ID format rather than a UIC format. For more information about rights identifiers, see the *OpenVMS Programming Concepts Manual*.

When working in nonlocal environments, be careful that the alphanumeric UIC or rights identifiers that you use are valid for the environment.

Qualifier

/DEVICE=device-spec

Specifies the disk volume containing the quota file. SYSMAN validates the device specification and translates any logical name in the target environment before deleting the UIC entry.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

Description

The DISKQUOTA REMOVE command eliminates the specified UIC from the quota file on the named device.

If the usage count for the UIC is not zero, files remain on disk and the user can still log in, but any attempt to create or extend files will fail.

The UIC [0,0] entry cannot be removed.

Example

```
SYSMAN> SET ENVIRONMENT/NODE=MARS
SYSMAN> SHOW PROFILE
%SYSMAN-I-DEFDIR, Default directory on node MARS -- WORK2:[CASEY]
%SYSMAN-I-DEFPRIV, Process privileges on node MARS --
    TMPMGX
    OPER
    NETMBX
    SYSPRV

SYSMAN> DISKQUOTA REMOVE /DEVICE=DUA45: [TTD,DAVIS]
```

The command in this example removes UIC [TTD,DAVIS] from the quota file for disk DUA45, which is located on node MARS.

DISKQUOTA SHOW

Displays quotas, overdrafts, and usage counts.

Requires no additional privileges to display your own quota, overdraft, and usage count, but otherwise requires read (R) access to the quota file.

Format

DISKQUOTA SHOW owner

Parameter

owner

Specifies the user identification code (UIC) or rights identifier. You can specify the UIC in numeric or alphanumeric format. For complete information on UIC specification, refer to the *OpenVMS AXP Guide to System Security*, or the *OpenVMS VAX Guide to System Security*, depending on your system.

Rights identifiers are granted with the Authorize utility and use an ID format rather than a UIC format. See the *OpenVMS Programming Concepts Manual* for a complete description of rights identifiers.

You can use an asterisk wildcard character (*) to specify the quota entry as follows:

| Command | Description |
|-------------------------|-----------------------------|
| DISKQUOTA SHOW [TTD,CJ] | Show user CJ in group TTD |
| DISKQUOTA SHOW [TTD,*] | Show all users in group TTD |
| DISKQUOTA SHOW * | Show all entries |

Qualifiers

/DEVICE=device-spec

Specifies the disk volume containing the quota file. DISKQUOTA validates device specification and translates any logical name in the target environment before displaying UIC entries.

Without a device specification, SYSMAN uses the default disk on the target node. Unless you have set a default device with the SET PROFILE command, the default disk is the current device on the local node or the login default device on another node, depending on the established environment.

/OUTPUT[=filespec]

Directs output to the specified file. Without a file specification, /OUTPUT defaults to SYSMAN.LIS in the current directory on the local node where you are running SYSMAN.

Example

```
SYSMAN> DISKQUOTA SHOW [ACCT,*]
```

The command in this example displays quotas, overdrafts, and usage counts for all users in group ACCT on the default disk.

DO

Executes a DCL command or DCL command procedure on all nodes in the current environment.

Requires the privileges of the DCL command being executed.

Format

DO [command-line]

Parameter

command-line

Specifies a command string that SYSMAN passes to the CLI for execution. For complete information on DCL command syntax, refer to the *OpenVMS DCL Dictionary*.

Qualifier

/OUTPUT[=filespec]

Records output from the command in the specified file, which is located on the node from which you are executing SYSMAN. Position the qualifier immediately after the DO command. The default file specification is SYSMAN.LIS in the current device and directory. SYSMAN prefaces output with the message “%SYSMAN-I-OUTPUT, command execution on node xxxxxx.”

Description

The DO command executes the accompanying DCL command or DCL command procedure on all nodes in the current environment. Each DO command executes as an independent process, so no process context is retained between DO commands. For this reason, you must express all DCL commands in a single command string, and you cannot run a program that expects input.

In a VMScluster environment, SYSMAN executes the commands sequentially on all nodes in the VMScluster. Each command executes completely before SYSMAN sends it to the next node in the environment. Any node that is unable to execute the command returns an error message. SYSMAN displays an error message if the timeout period expires before the node responds.

Use the RSX command MCR to run programs located in SYS\$SYSTEM. The MCR command enables you to run a program and supply a command in a single command string.

Three exceptions to be aware of when using the DO command in clusters are:

- In a dual-architecture heterogeneous cluster running both OpenVMS VAX and OpenVMS Alpha, some uses of the DO command may require special handling. For example, if you are installing images that are named differently in each architecture, you can still use the DO command if you create logical name tables for VAX and for Alpha nodes. See the example sequence that follows this description for an example.

- Some DCL commands, such as MOUNT/CLUSTER or SET QUORUM /CLUSTER, operate clusterwide by design. It is best to avoid using these kinds of commands with the DO command in SYSMAN when the environment is set to cluster. As alternatives, you could leave SYSMAN temporarily with the SPAWN command and execute these commands in DCL, or you could define the environment to be a single node within the VMScluster.
- Make sure that if you redefine the logical DCLTABLES, you do so in SYLOGICALS.COM, not in SYSTARTUP_VMS.COM or elsewhere. Otherwise, you will receive a command interpreter failure when executing a DO command on a remote node.

Examples

1.

```
SYSMAN> SET ENVIRONMENT/CLUSTER/NODE=NODE21
SYSMAN> DO/OUTPUT SHOW DEVICE
```

The first command in this example defines the management environment to be the VMScluster where NODE21 is a member. The second command executes a DCL command on each node in the VMScluster. Output goes to the file SYSMAN.LIS rather than to the terminal.

2.

```
SYSMAN> SET PROFILE /PRIVILEGES=(CMKRNL,SYSPRV) -
_SYSMAN> /DEFAULT=SYS$SYSTEM
SYSMAN> DO INSTALL ADD /OPEN/SHARED WRKD$:[MAIN]STATSHR
SYSMAN> DO MCR AUTHORIZE ADD JONES/PASSWORD=COLUMBINE -
_SYSMAN> /DEVICE=WORK1 /DIRECTORY=[JONES]
```

The first command in this example adds CMKRNL and SYSPRV privileges to the current profile because they are required by the INSTALL command and the AUTHORIZE command. The next command installs the file STATSHR. The last command sets up an account for user JONES, specifying a password as well as a default device and directory.

The MCR command in the last line of the example enables you to invoke the AUTHORIZE command from SYS\$SYSTEM and add a record to the UAF in one command string.

3.

```
SYSMAN> SET ENVIRONMENT/NODE=NODE21
SYSMAN> SET PROFILE /DEFAULT=[CJ.PROGRAMS] -
_SYSMAN> /PRIVILEGES=NOSYSPRV
SYSMAN> DO/OUTPUT @PROCESS_INFO
```

The commands in this example define the environment as a single node and adjust the current privileges and directory. The DO command executes the command procedure PROCESS_INFO.COM, located in directory [CJ.PROGRAMS] and writes any output to SYSMAN.LIS in the directory from which SYSMAN is running.

4.

```
$ CREATE/NAME_TABLE/PARENT=LNMS$SYSTEM_DIRECTORY SYSMAN$NODE_TABLE
$ DEFINE/TABLE=SYSMAN$NODE_TABLE ALPHA_NODES NODE21,NODE22,NODE23
$ DEFINE/TABLE=SYSMAN$NODE_TABLE VAX_NODES NODE24,NODE25,NODE26
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> SET ENVIRONMENT/NODE=ALPHA_NODES
%SYSMAN-I-ENV, current command environment:
    Individual nodes: NODE21,NODE22,NODE23
    Username BOUCHARD will be used on nonlocal nodes
```


SYSMAN DO

```
SYSMAN> DO INSTALL REPLACE SYS$LIBRARY:DCLTABLES.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE21
%SYSMAN-I-OUTPUT, command execution on node NODE22
%SYSMAN-I-OUTPUT, command execution on node NODE23
SYSMAN> DO INSTALL REPLACE SYS$SYSTEM:DEC_FORTTRAN.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE21
%SYSMAN-I-OUTPUT, command execution on node NODE22
%SYSMAN-I-OUTPUT, command execution on node NODE23

SYSMAN> SET ENVIRONMENT/NODE=VAX_NODES
%SYSMAN-I-ENV, current command environment:
    Individual nodes: NODE24,NODE25,NODE26
    Username BOUCHARD will be used on nonlocal nodes

SYSMAN> DO INSTALL REPLACE SYS$LIBRARY:DCLTABLES.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE24
%SYSMAN-I-OUTPUT, command execution on node NODE25
%SYSMAN-I-OUTPUT, command execution on node NODE26
SYSMAN> DO INSTALL REPLACE SYS$SYSTEM:FORTTRAN$MAIN.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE24
%SYSMAN-I-OUTPUT, command execution on node NODE25
%SYSMAN-I-OUTPUT, command execution on node NODE26
```

This example shows how you can define logical names for VAX and Alpha nodes in a dual-architecture heterogeneous cluster, so that you can use the DO command to install architecture-specific images.

EXIT

Terminates the SYSMAN session and returns control to the DCL command level. Any profile changes, established on the local node with the command SET PROFILE, are restored to their values at the time SYSMAN was invoked. You can also press Ctrl/Z to exit at any time.

Format

EXIT

Parameters

None.

Qualifiers

None.

HELP

Provides online help for using the SYSMAN commands, parameters, and qualifiers. Press Ctrl/Z to exit.

Format

HELP [keyword...]

Parameter

keyword

Specifies the command, parameter, or qualifier for which you want help. If you omit the keyword, the HELP command displays a list of Help topics and prompts you for a particular keyword.

Qualifiers

None.

Example

```
SYSMAN> HELP DO
```

The command in this example displays help information about the SYSMAN command, DO.

IO AUTOCONFIGURE (Alpha Only)

Alpha

On Alpha systems, automatically identifies and configures all hardware devices attached to a system by connecting devices and loading their drivers. On VAX systems, use the SYSGEN command AUTOCONFIGURE.

You must have CMKRNL and SYSLCK privileges to use the IO AUTOCONFIGURE command.

Format

IO AUTOCONFIGURE

Parameters

None.

Qualifiers

/SELECT=(device_name)

Specifies the device type to be automatically configured. Use valid device names or mnemonics that indicate the devices to be included in the configuration. You can use wildcard characters with this qualifier.

The /SELECT and /EXCLUDE qualifiers are not mutually exclusive, as they are on VAX systems. You can specify both qualifiers on the command line.

Table 6-3 shows /SELECT qualifier examples.

Table 6-3 /SELECT Qualifier Examples

| Command | Devices That Are Configured | Devices That Are Not Configured |
|------------|-----------------------------|---------------------------------|
| /SELECT=P* | PKA,PKB,PIA | None |

(continued on next page)

SYSMAN IO AUTOCONFIGURE (Alpha Only)

Table 6-3 (Cont.) /SELECT Qualifier Examples

| Command | Devices That Are Configured | Devices That Are Not Configured |
|--------------|-----------------------------|---------------------------------|
| /SELECT=PK* | PKA,PKB | PIA |
| /SELECT=PKA* | PKA | PKB,PIA |

/EXCLUDE=(device_name)

Specifies the device type that should not be automatically configured. Use valid device names or mnemonics that indicate the devices to be excluded from the configuration. You can use wildcard characters with this qualifier.

The /SELECT and /EXCLUDE qualifiers are not mutually exclusive, as they are on VAX systems. You can specify both qualifiers on the command line.

/LOG

Controls whether the IO AUTOCONFIGURE command displays information about loaded devices.

Description

The IO AUTOCONFIGURE command identifies and configures all hardware devices attached to a system. VAX system managers use the SYSGEN command AUTOCONFIGURE. It connects devices and loads their drivers. You must have CMKRNL and SYSCLK privileges to use the IO AUTOCONFIGURE command.

Examples

1. SYSMAN> IO AUTOCONFIGURE/EXCLUDE=DKA0

The command in this example autoconfigures all devices on the system except for DKA0.

IO AUTOCONFIGURE automatically configures all standard devices that are physically attached to the system, except for the network communications device.

2. SYSMAN> IO AUTOCONFIGURE/LOG

The /LOG qualifier displays information about all the devices that AUTOCONFIGURE loads. ♦

IO CONNECT (Alpha Only)

Alpha

On Alpha systems, connects a hardware device and loads its driver, if the driver is not already loaded. On VAX systems, use the SYSGEN command CONNECT.

You must have CMKRNL and SYSCLK privileges to use the IO CONNECT command.

Format

IO CONNECT device-name[:]

Parameters

device-name[:]

Specifies the name of the hardware device to be connected. The device name requires the following format:

device-type controller unit-number

For example, in the designation LPA0, LP is a line printer on controller A at unit number 0. If you use the /NOADAPTER qualifier, the device is the software to be loaded.

Qualifiers

/ADAPTER=tr_number

/NOADAPTER (default)

Specifies the nexus number of the adapter to which the specified device is connected. It is a nonnegative 32-bit integer. The /NOADAPTER qualifier indicates that the device is not associated with any particular hardware. The /NOADAPTER qualifier is compatible with the /DRIVER_NAME qualifier only.

/CSR=csr_address

Specifies the CSR address for the device being configured. This address must be specified in hexadecimal. You must precede the CSR address with %X. The CSR address is a quadword value that is loaded into IDB\$Q_CSR without any interpretation by SYSMAN. This address can be physical or virtual, depending on the specific device being connected:

- /CSR=%X3A0140120 for a physical address
- /CSR=%XFFFFFFFF807F8000 for a virtual address (the sign extension is required for Alpha virtual addresses)

This qualifier is required if /ADAPTER=tr_number is specified.

/DRIVER_NAME=filespec

Specifies the name of the device driver that you are loading. If you do not specify this qualifier, SYSMAN obtains the default in the same way that the SYSGEN default name is determined. For example, if you want to load the Digital-supplied SYS\$ELDRIVER.EXE, the prefix SYS\$ must be present. Without the SYS\$, SYSMAN looks for ELDRIVER.EXE in SYS\$LOADABLE_IMAGES. This implementation separates the user device driver namespace from the Digital-supplied device driver namespace.

/LOG=(ALL,CRB,DDB,DPT,IDB,SB,UCB)

/NOLOG (default)

Controls whether SYSMAN displays the addresses of the specified control blocks. The default value for the /LOG qualifier is /LOG=ALL. If /LOG=UCB is specified, a message similar to the following is displayed:

%SYSMAN-I-IOADDRESS, the UCB is located at address 805AB000

The default is /NOLOG.

SYSMAN IO CONNECT (Alpha Only)

/MAX_UNITS=maximum-number-of-units

Specifies the maximum number of units the driver can support. The default is specified in the driver prologue table (DPT) of the driver. If the number is not specified in the DPT, the default is 8. This number must be greater than or equal to the number of units specified by /NUM_UNITS. This qualifier is optional.

/NUM_UNITS=number-of-units

Specifies the number of units to be created. The starting device number is the number specified in the device name parameter. For example, the first device in DKA0 is 0. Subsequent devices are numbered sequentially. The default is 1. This qualifier is optional.

/NUM_VEC=vector-count

Specifies the number of vectors for this device. The default vector count is 1. The /NUM_VEC qualifier is optional. This qualifier should be used only when using the /VECTOR_SPACING qualifier. When using the /NUM_VEC qualifier, you must also use the /VECTOR qualifier to supply the base vector.

/SYS_ID=number-of-remote-system

Indicates the SCS system ID of the remote system to which the device is to be connected. It is a 64-bit integer; you must specify the remote system number in hexadecimal. The default is the local system. This qualifier is optional.

/VECTOR=(vector-address,...)

Specifies the interrupt vectors for the device or lowest vector. This is either a byte offset into the SCB of the interrupt vector for directly vectored interrupts or a byte offset into the ADP vector table for indirectly vectored interrupts. The values must be longword aligned. To specify the vector address in octal or hexadecimal, precede the address with %O or %X, respectively. The /VECTOR qualifier is required when you use the /ADAPTER=tr_number qualifier or the /NUM_VEC=vector-count qualifier. You can list up to 64 vectors.

/VECTOR_SPACING=number-of-bytes-between-vectors

Specifies the spacing between vectors. Specify the amount as a multiple of 16 bytes. The default is 16. You must specify both the base vector with /VECTOR and the number of vectors with /NUM_VEC. This qualifier is optional.

Description

The IO CONNECT command connects a hardware device and loads its driver, if the driver is not already loaded. VAX system managers use the SYSGEN command CONNECT. You must have CMKRNL and SYSLOCK privileges to use the IO CONNECT command.

Examples

1. `SYSMAN> IO CONNECT DKA0:/DRIVER_NAME=SYS$DKDRIVER/CSR=%X80AD00-
/ADAPTER=4/NUM_VEC=3/VECTOR_SPACING=%X10/VECTOR=%XA20/LOG`

%SYSMAN-I-IOADDRESS, the CRB is located at address 805AEC40
%SYSMAN-I-IOADDRESS, the DDB is located at address 805AA740
%SYSMAN-I-IOADDRESS, the DPT is located at address 80D2A000
%SYSMAN-I-IOADDRESS, the IDB is located at address 805AEE80
%SYSMAN-I-IOADDRESS, the SB is located at address 80417F80
%SYSMAN-I-IOADDRESS, the UCB is located at address 805B68C0

This command example connects device DKA0, loads driver SYS\$DKDRIVER, and specifies the following:

Physical CSR address
Adapter number
Number of vectors
Spacing between vectors
Interrupt vector address

The /LOG qualifier displays the addresses of all control blocks, as shown.

2. `SYSMAN> IO CONNECT DKA0:/DRIVER_NAME=SYS$DKDRIVER/CSR=%X80AD00-
/ADAPTER=4/VECTOR=(%XA20,%XA30,%XA40)/LOG=(CRB,DPT,UCB)`
`%SYSMAN-I-IOADDRESS, the CRB is located at address 805AEC40`
`%SYSMAN-I-IOADDRESS, the DPT is located at address 80D2A000`
`%SYSMAN-I-IOADDRESS, the UCB is located at address 805B68C0`

This command example connects device DKA0, loads driver SYS\$DKDRIVER, and specifies the following:

Physical CSR address
Adapter number
Addresses for interrupt vectors

The /LOG qualifier displays the addresses of the channel request block (CRB), the driver prologue table (DPT), and the unit control block (UCB).

3. `SYSMAN> IO CONNECT FTA0:/DRIVER=SYS$FTDRIVER/NOADAPTER/LOG=(ALL)`
`%SYSMAN-I-IOADDRESS, the CRB is located at address 805AEC40`
`%SYSMAN-I-IOADDRESS, the DDB is located at address 805AA740`
`%SYSMAN-I-IOADDRESS, the DPT is located at address 80D2A000`
`%SYSMAN-I-IOADDRESS, the IDB is located at address 805AEE80`
`%SYSMAN-I-IOADDRESS, the SB is located at address 80417F80`
`%SYSMAN-I-IOADDRESS, the UCB is located at address 805B68C0`

This command example connects pseudoterminal FTA0, loads driver SYS\$FTDRIVER, and uses the /NOADAPTER qualifier to indicate that FTA0 is not an actual hardware device. The /LOG=(ALL) qualifier displays the addresses of all control blocks, as shown. ♦

IO LOAD (Alpha Only)

Alpha

On Alpha systems, loads an I/O driver. On VAX systems, use the SYSGEN command LOAD.

You must have CMKRNL and SYSLCK privileges to use the IO LOAD command.

Format

`IO LOAD filespec`

Parameters

filespec

Specifies the file name of the driver to be loaded. This parameter is required.

SYSMAN IO LOAD (Alpha Only)

Qualifiers

/LOG=(ALL,DPT)

Controls whether SYSMAN displays information about drivers that have been loaded. The default value for the /LOG qualifier is /LOG=ALL. The driver prologue table (DPT) address is displayed when either /LOG=DPT or /LOG=ALL is specified.

Description

The IO LOAD command loads an I/O driver. VAX system managers use the SYSGEN command LOAD. You must have CMKRNL and SYSCLK privileges to use the IO LOAD command.

Example

```
SYSMAN> IO LOAD/LOG SYS$DKDRIVER
%SYSMAN-I-IOADDRESS, the DPT is located at address 80D5A000
```

This example loads device SYS\$DKDRIVER and displays the address of the driver prologue table (DPT).♦

IO SET EXCLUDE

Sets the permanent exclusion list to be used when configuring devices automatically.

Format

IO SET EXCLUDE = (device_name)

Parameters

(device_name)

Specifies the device type to be excluded from automatic configuration. Use valid device names or mnemonics that indicate the devices to be included in the permanent exclusion list. You can specify wildcards.

Qualifiers

None.

Description

Sets the permanent exclusion list to be used when configuring devices.

Example

```
SYSMAN> IO SET EXCLUDE=(DKC500,DKD*)
```

This example specifies that DKC500 and all DKD devices are not to be autoconfigured.

Refer to the /SELECT qualifier of the SYSMAN command IO AUTOCONFIGURE in the *OpenVMS System Management Utilities Reference Manual* for additional examples that show how to specify device names.

IO SET PREFIX (Alpha Only)

Alpha

On Alpha systems, sets the prefix list that is used to manufacture the IOGEN Configuration Building Module (ICBM) names.

Format

IO SET PREFIX =icbm_prefix

Parameters

icbm_prefix

Specifies ICBM prefixes. These prefixes are used by the IO AUTOCONFIGURE command to build ICBM image names.

Qualifiers

None.

Description

The IO SET PREFIX command sets the prefix list which is used to manufacture ICBM names.

Example

```
SYSMAN> IO SET PREFIX=(SYSS$,PSI$,VME_)
```

This example specifies the prefix names used by IO AUTOCONFIGURE to build the ICBM names. The prefixes are SYSS\$, PSI\$, and VME_♦

IO SHOW BUS (Alpha Only)

Alpha

On Alpha systems, lists all the buses, node numbers, bus names, TR numbers, and base CSR addresses on the system. This display exists primarily for internal engineering support. On VAX systems, use the SYSGEN command SHOW/BUS.

Parameters

None.

Qualifiers

None.

Description

The IO SHOW BUS command lists all the buses, node numbers, bus names, TR numbers, and base CSR addresses. This display exists primarily for internal engineering support. You must have CMKRNL privilege to use IO SHOW BUS.

SYSMAN IO SHOW BUS (Alpha Only)

Example

```
SYSMAN> IO SHOW BUS
```

| Bus | Node | TR# | Name | Base CSR |
|--------------|------|-----|-------------|------------------|
| LSB | 0 | 1 | EV3 4MB | FFFFFFFF86FA0000 |
| LSB | 6 | 1 | MEM | FFFFFFFF86FC4000 |
| LSB | 7 | 1 | MEM | FFFFFFFF86FCA000 |
| LSB | 8 | 1 | IOP | FFFFFFFF86FD0000 |
| XZA XMI-SCSI | 0 | 3 | XZA-SCSI | 0000008001880000 |
| XZA XMI-SCSI | 1 | 3 | XZA-SCSI | 0000008001880000 |
| XZA XMI-SCSI | 0 | 4 | XZA-SCSI | 0000008001900000 |
| XZA XMI-SCSI | 1 | 4 | XZA-SCSI | 0000008001900000 |
| XMI | 4 | 2 | LAMB | 0000008001A00000 |
| DEMNA | 0 | 5 | Generic XMI | 0000008001E80000 |
| DEMNA | 0 | 6 | Generic XMI | 0000008001F00000 |

This example is from a DEC 7000 Model 600. Displays vary among different Alpha systems.

The indentation levels are deliberate in this display. They indicate the hierarchy of the adapter control blocks in the system. The column titles in the display have the following meanings:

| Column Titles | Meaning |
|---------------|--|
| Bus | Identity of the bus |
| Node | Index into the associated bus array; the bus slot |
| TR# | Nexus number of the adapter to which the specified device is connected |
| Name | Name of the device |
| Base CSR | Base CSR address of the device♦ |

IO SHOW DEVICE (Alpha Only)

Alpha

On Alpha systems, displays information on device drivers loaded into the system, the devices connected to them, and their I/O databases. All addresses are in hexadecimal and are virtual. On VAX systems, use the SYSGEN command SHOW/DEVICE.

Format

```
IO SHOW DEVICE
```

Parameters

None.

Qualifiers

None.

Description

The IO SHOW DEVICE command displays information on the device drivers loaded into the system, the devices connected to them, and their I/O databases.

The IO SHOW DEVICE command specifies that the following information be displayed about the specified device driver:

| | |
|--------|--|
| Driver | Name of the driver |
| Dev | Name of each device connected to the driver |
| DDB | Address of the device's device data block |
| CRB | Address of the device's channel request block |
| IDB | Address of the device's interrupt dispatch block |
| Unit | Number of each unit on the device |
| UCB | Address of each unit's unit control block |

All addresses are in hexadecimal and are virtual.

Refer to *A Comparison of System Management on OpenVMS AXP and OpenVMS VAX* and the *OpenVMS System Manager's Manual* for additional information about SYSMAN.

Example

SYSMAN> IO SHOW DEVICE

The following is a sample display produced by the IO SHOW DEVICE command:

| Driver | Dev | DDB | CRB | IDB | Unit | UCB |
|----------------|-----|----------|----------|----------|------|----------|
| SYS\$FTDRIVER | | | | | | |
| | FTA | 802CE930 | 802D1250 | 802D04C0 | 0 | 801C3710 |
| SYS\$EUDRIVER | | | | | | |
| | EUA | 802D0D80 | 802D1330 | 802D0D10 | 0 | 801E35A0 |
| SYS\$DKDRIVER | | | | | | |
| | DKI | 802D0FB0 | 802D0F40 | 802D0E60 | 0 | 801E2520 |
| SYS\$PKADRIVER | | | | | | |
| | PKI | 802D1100 | 802D13A0 | 802D1090 | 0 | 801E1210 |
| SYS\$TTDRIVER | | | | | | |
| OPERATOR | | | | | | |
| NLDRIVER | | | | | | |

SYS\$TTDRIVER, OPERATOR, and NLDRIVER do not have devices associated with them.♦

IO SHOW EXCLUDE

Displays the permanent exclusion list used in the autoconfiguration of devices.

Format

IO SHOW EXCLUDE

SYSMAN IO SHOW EXCLUDE

Parameters

None.

Qualifiers

None.

Description

The IO SHOW EXCLUDE command displays the permanent exclusion list on the console. This list is used in the autoconfiguration of devices.

Example

```
SYSMAN> IO SHOW EXCLUDE
%SYSMAN-I-IOEXCLUDE, the current permanent exclusion list is: DKC500,DKD*
```

This command example shows the permanent exclusion list used in the autoconfiguration of devices; the current list contains DKC500 and all DKD devices. ♦

IO SHOW PREFIX (Alpha Only)

Alpha

On Alpha systems, displays the current prefix list used in the manufacture of IOGEN Configuration Building Module (ICBM) names.

Format

IO SHOW PREFIX

Parameters

None.

Qualifiers

None.

Description

The IO SHOW PREFIX command displays the current prefix list on the console. This list is used by the IO AUTOCONFIGURE command to build ICBM names.

Example

```
SYSMAN> IO SHOW PREFIX
%SYSMAN-I-IOPREFIX, the current prefix list is: SYS$,PSI$,VME_
```

This command example shows the prefixes used by IO AUTOCONFIGURE to build ICBM names. ♦

LICENSE LOAD

Activates licenses registered in the LICENSE database.

Requires CMKRNL, SYSNAM, and SYSPRV privileges.

Format

LICENSE LOAD product

Parameter

product

Specifies the name of the product whose license you want to activate.

Qualifiers

/DATABASE=filespec

Enables you to specify the location of the LICENSE database. The default file specification is SYS\$COMMON:[SYSEXE]LMF\$LICENSE.LDB. Using the /DATABASE qualifier is not necessary if you use the default LICENSE database name and location.

/PRODUCER=string

Enables you to specify the name of the company that owns the product for which you have a license. Use this qualifier only if the product is from a company other than Digital.

Description

You can use the LICENSE LOAD command to activate licenses on multiple systems and on nonlocal systems in the system management environment. The SYSMAN LICENSE commands are a subset of the License Management Facility (LMF) commands. For more information about the LMF, see the *OpenVMS License Management Utility Manual*.

Example

```
SYSMAN> LICENSE LOAD FORTRAN
```

The command in this example activates the license for DEC Fortran for OpenVMS. Because the license is for a Digital product, the command does not include the /PRODUCER qualifier.

LICENSE UNLOAD

Deactivates licenses registered in the LICENSE database.

Requires CMKRNL, SYSNAM, and SYSPRV privileges.

SYSMAN LICENSE UNLOAD

Format

LICENSE UNLOAD [product]

Parameter

product

Specifies the name of the product whose license you want to deactivate. If you enter the **LICENSE UNLOAD** command without specifying a product name, the system deactivates all available registered licenses.

Qualifier

/PRODUCER=string

Enables you to specify the name of the company that owns the product for which you have a license. Use this qualifier only if the product is from a company other than Digital.

Description

You can use the **LICENSE UNLOAD** command to deactivate licenses on multiple systems and on nonlocal systems in the system management environment. The **SYSMAN LICENSE** commands are a subset of the License Management Facility (LMF) commands. For more information about the LMF, see the *OpenVMS License Management Utility Manual*.

Example

```
SYSMAN> LICENSE UNLOAD FORTRAN
```

This command deactivates the license for DEC Fortran for OpenVMS. Because the license is for a Digital product, the command does not include the **/PRODUCER** qualifier.

PARAMETERS DISABLE CHECKS

Bypasses validation of parameter values. **SYSMAN** parameter validation ensures that the parameters fall within the defined minimum and maximum values specified in the **PARAMETERS SET** command.

Format

PARAMETERS DISABLE CHECKS

Parameters

None.

Qualifiers

None.

Description

The **PARAMETERS DISABLE CHECKS** command enables you to override minimum and maximum values established for system parameters. **SYSMAN** does parameter checks by default. If you attempt to set parameter values outside the allowable limits when checks are enabled, the operating system issues an error message. By disabling checks you can set parameter values regardless of the minimum and maximum limits.

Note

Range checks are enabled by default because Digital suggests that systems operate within these minimum and maximum values. Setting parameters outside these limits can result in system failures or hangs.

Example

```
SYSMAN> SET ENVIRONMENT/CLUSTER
SYSMAN> SET PROFILE/DEFAULT=SYS$SYSTEM/PRIVILEGES=CMEXEC
SYSMAN> PARAMETERS SET MAXPROCESSCNT 10
%SMI-E-OUTRANGE, parameter is out of range
SYSMAN> PARAMETERS DISABLE CHECKS
SYSMAN> PARAMETERS SET MAXPROCESSCNT 10
```

In this example, the initial attempt to set **MAXPROCESSCNT** below the minimum fails because range checks are enabled. However, once range checks are disabled, the **PARAMETERS SET MAXPROCESSCNT** command succeeds.

PARAMETERS ENABLE CHECKS

Validates all parameter values to ensure that they fall within the defined minimum and maximum values.

Because range checks are enabled by default, use **PARAMETERS ENABLE CHECKS** after entering a **PARAMETERS DISABLE CHECKS** command.

Format

PARAMETERS ENABLE CHECKS

Parameters

None.

Qualifiers

None.

SYSMAN PARAMETERS ENABLE CHECKS

Example

```
SYSMAN> PARAMETERS DISABLE CHECKS
SYSMAN> PARAMETERS SET WSMAX 20
SYSMAN> PARAMETERS ENABLE CHECKS
SYSMAN> PARAMETERS SET WSMAX 30
%SMI-E-OUTRANGE, parameter is out of range
SYSMAN> PARAMETERS SHOW WSMAX
Parameter Name      Current  Default  Minimum  Maximum Unit  Dynamic
WSMAX                2000    1024     60      6400 pages
```

The **PARAMETERS ENABLE CHECKS** command in this example illustrates that when range checking is disabled, the system accepts a working set value (WSMAX) of 20. However, once range checking is enabled with the **PARAMETERS ENABLE CHECKS** command, the system does not accept a WSMAX below the minimum, which is 60.

PARAMETERS SET

Changes the value of a specific parameter in the work area.

The **PARAMETERS SET** command does not modify parameter files, the current system parameter file on disk, or the active system. For information on performing these modifications, see the **PARAMETERS WRITE** command.

Format

```
PARAMETERS SET parameter-name
                value
                /STARTUP filespec
```

Parameters

parameter-name

Specifies the name of the parameter to modify. Instead of a name, you can enter a period (.) to change the value of the most recently displayed or the most recently modified parameter. See the **PARAMETERS SHOW** command for an example of using the period in place of a parameter name.

For a list of system parameters and further information on them, use the command **HELP PARAMETERS**.

value

Specifies the new value for the parameter. Enclose values for ASCII parameters in quotation marks if they contain embedded spaces or other special characters.

Typically the value is an integer or the keyword **DEFAULT**. The keyword **DEFAULT** sets the parameter to its default value. The **PARAMETERS SHOW** command displays the defined minimum, maximum, and default values for the parameter, which are required unless range checking is disabled with the command **PARAMETERS DISABLE CHECKS**.

Qualifiers

/STARTUP filespec

Sets the name of the site-independent startup procedure to the given file specification. A file specification has a maximum length of 31 characters. The initial startup command procedure is SYS\$SYSTEM:STARTUP.COM.

Examples

1. SYSMAN> PARAMETERS SET PFCDEFAULT 20

The PARAMETERS SET command in this example assigns a value of 20 to the PFCDEFAULT parameter.

2. SYSMAN> PARAMETERS SET GBLSECTIONS DEFAULT

The PARAMETERS SET command in this example assigns the default value (40) to the GBLSECTIONS parameter.

3. SYSMAN> PARAMETERS SET/STARTUP SYS\$SYSTEM:XSTARTUP.COM

The command in this example assigns SYS\$SYSTEM:XSTARTUP.COM as the current site-independent startup command procedure.

PARAMETERS SHOW

Displays the value of a parameter or a group of parameters in the work area. In addition, the command shows the minimum, maximum, and default values of a parameter and its unit of measure.

Format

PARAMETERS SHOW [parameter-name]

Parameter

parameter-name

Specifies the name of a parameter or a period (.). A period is interpreted as a request for the parameter specified in the last PARAMETERS SET or PARAMETERS SHOW command. The parameter name can be abbreviated, but the abbreviation must be unique because SYSMAN selects the first parameter that matches.

Qualifiers

/ACP

Displays all Files-11 ACP parameters.

/ALL

Displays the values of all active parameters.

/CLUSTER

Displays all parameters specific to VMScclusters.

SYSMAN PARAMETERS SHOW

/DYNAMIC

Displays all parameters that would be in effect immediately after you enter a PARAMETERS WRITE ACTIVE command.

/GEN

Displays all general parameters.

/HEX

Displays numeric parameters in hexadecimal rather than decimal radix. Specify the /HEX system parameter name or the parameter type. If you specify the /HEX qualifier with the /NAMES qualifier, /HEX is ignored.

/JOB

Displays all Job Controller parameters.

/LGI

Displays all LOGIN security control parameters.

/MAJOR

Displays the most important parameters.

/MULTIPROCESSING

Displays parameters specific to multiprocessing.

/NAMES

Displays only parameter names. You can combine other qualifiers with this one.

/OUTPUT

Directs output to the specified file rather than SYS\$OUTPUT. Without a file specification, the output goes to SYSMAN.LIS in the current directory.

/PQL

Displays the parameters for all default process quotas.

/RMS

Displays all parameters specific to OpenVMS Record Management Services (RMS).

/SCS

Displays all parameters specific to VMScluster System Communications Services.

/SPECIAL

Displays all special control parameters.

/STARTUP

Displays the name of the site-independent startup procedure.

/SYS

Displays all active system parameters.

/TTY

Displays all parameters for terminal drivers.

Description

SYSMAN displays parameters in decimal unless you specify the /HEX qualifier. ASCII values are always displayed in ASCII.

Abbreviations for parameter names must be unique because SYSMAN displays the first parameter matching the abbreviation. Ambiguity checks do not occur. For example, a specification of PARAMETERS SHOW GBL displays the GBLSECTIONS parameter. To display the GBLPAGFIL parameter, you must specify PARAMETERS SHOW GBLPAGF to avoid displaying the GBLPAGES parameter.

You can use a period (.) to indicate that you want to work with the system parameter that you specified in the last PARAMETERS SET or PARAMETERS SHOW command.

Examples

```
1. SYSMAN> PARAMETERS SHOW GBLSECTIONS
Parameter Name   Current   Default   Minimum   Maximum Unit   Dynamic
GBLSECTIONS      100       40        20        -1 Sections

SYSMAN> PARAMETERS SET . 110
SYSMAN> PARAMETERS SHOW .
Parameter Name   Current   Default   Minimum   Maximum Unit   Dynamic
GBLSECTIONS      110       40        20        -1 Sections
```

In this example, the user first displays the values of the GBLSECTIONS parameter and then refers to the parameter with a period to set its current value to 110. The next PARAMETERS SHOW command also uses the period notation to obtain confirmation that the change occurred.

```
2. SYSMAN> PARAMETERS SHOW/ACP
```

The PARAMETERS SHOW command in this example produces output similar to the following:

```
Parameters in use: Active
Parameter Name   Current   Default   Minimum   Maximum Unit   Dynamic
ACP_MULTIPLE     0         1         0         1 Boolean    D
ACP_SHARE        1         1         0         1 Boolean    D
ACP_MAPCACHE     52        8         1        -1 Pages    D
ACP_HDRCACHE    138       128       2        -1 Pages    D
ACP_DIRCACHE    138       80        2        -1 Pages    D
ACP_DINDXCACHE  37        25        2        -1 Pages    D
ACP_WORKSET      0         0         0        -1 Pages    D
ACP_FIDCACHE    64        64        0        -1 File-Ids D
ACP_EXTCACHE    64        64        0        -1 Extents  D
ACP_EXTLIMIT    300       300       0       1000 Percent/10 D
ACP_QUOCACHE    130       64        0        -1 Users    D
ACP_SYSACC      4         8         0        -1 Directories D
ACP_MAXREAD     32       32        1        64 Blocks   D
ACP_WINDOW      7         7         1        -1 Pointers  D
ACP_WRITEBACK    1         1         0         1 Boolean    D
ACP_DATACHECK    2         2         0         3 Bit-mask  D
ACP_BASEPRIO    8         8         4        31 Priority  D
ACP_SWAPFLGS    14       15        0        15 Bit-mask  D
ACP_XQP_RES     1         1         0         1 Boolean    D
ACP_REBLDSYS    0         1         0         1 Boolean
```


SYSMAN PARAMETERS SHOW

3. SYSMAN> PARAMETERS SHOW/ACP/HEX

The **PARAMETERS SHOW** command in this example produces a hexadecimal display of the values of the ACP system parameters.

```
Parameters in use: Active
Parameter Name      Current   Default   Minimum   Maximum   Unit   Dynamic
ACP_MULTIPLE        00000000 00000001 00000000 00000001 Boolean  D
ACP_SHARE            00000001 00000001 00000000 00000001 Boolean
ACP_MAPCACHE         00000034 00000008 00000001 FFFFFFFF Pages    D
ACP_HDRCACHE         0000008A 00000080 00000002 FFFFFFFF Pages    D
ACP_DIRCACHE         0000008A 00000050 00000002 FFFFFFFF Pages    D
ACP_DNDXCACHE        00000025 00000019 00000002 FFFFFFFF Pages    D
ACP_WORKSET          00000000 00000000 00000000 FFFFFFFF Pages    D
ACP_FIDCACHE         00000040 00000040 00000000 FFFFFFFF File-Ids  D
ACP_EXTCACHE         00000040 00000040 00000000 FFFFFFFF Extents  D
ACP_EXTLIMIT         0000012C 0000012C 00000000 000003E8 Percent/10 D
ACP_QUOCACHE         00000082 00000040 00000000 FFFFFFFF Users    D
ACP_SYSACC           00000004 00000008 00000000 FFFFFFFF Directories D
ACP_MAXREAD          00000020 00000020 00000001 00000040 Blocks    D
ACP_WINDOW           00000007 00000007 00000001 FFFFFFFF Pointers  D
ACP_WRITEBACK        00000001 00000001 00000000 00000001 Boolean  D
ACP_DATACHECK        00000002 00000002 00000000 00000003 Bit-mask  D
ACP_BASEPRIO         00000008 00000008 00000004 0000001F Priority  D
ACP_SWAPFLGS         0000000E 0000000F 00000000 0000000F Bit-mask  D
ACP_XQP_RES          00000001 00000001 00000000 00000001 Boolean
ACP_REBLDSYS         00000000 00000001 00000000 00000001 Boolean
```

4. SYSMAN> PARAMETERS SHOW/STARTUP Startup command file = SYS\$SYSTEM:STARTUP.COM

The **PARAMETERS SHOW** command in this example displays the name of the site-independent startup command procedure.

PARAMETERS USE

Reads a set of system parameters into the work area for display or modification.

Format

PARAMETERS USE source

Parameter

source

The source of a system parameter file for data to be read into the work area. The source can be any of the following:

- **ACTIVE**—Read parameters from memory. When you invoke **SYSMAN**, active values are in effect.
- **CURRENT**—Read parameters from the file **SYS\$SYSTEM:ALPHAVMSSYS.PAR**, which contains the current parameters. Using the current parameters requires read (R) access to **SYS\$SYSTEM:ALPHAVMSSYS.PAR**.

VAX

On VAX systems, the file that contains current parameters is `SYS$SYSTEM:VAXVMSSYS.PAR`. ♦

- **filespec**—Read parameters from a previously created system parameter file. The default file type is `.PAR` and you need read access to the file.
- **DEFAULT**—Read a parameter set containing the default values for all parameters. These values are supplied with the operating system.

Qualifiers

None.

Description

The **PARAMETERS USE** command activates the parameter values in memory (**ACTIVE**), on disk (**CURRENT**), in a file, or in default, depending on the source you enter with the command.

Example

```
SYSMAN> PARAMETERS USE DEFAULT
```

The **PARAMETERS USE** command in this example activates the default parameter values that are supplied with the operating system.

PARAMETERS WRITE

Writes the contents of the work area to memory, to disk, or to a file, depending on the destination that you specify.

Format

PARAMETERS WRITE destination

Parameter

destination

The destination of a new parameter file can be any of the following:

- **ACTIVE**—Write parameters to memory. Using the **ACTIVE** parameter requires **CMKRNL** privilege.
- **CURRENT**—Write parameters to the file `SYS$SYSTEM:ALPHAVMSSYS.PAR`, which contains the current parameters on disk. Using the current parameter requires write (**W**) access to `SYS$SYSTEM:ALPHAVMSSYS.PAR`.

VAX

On VAX systems, the file that contains current parameters is `SYS$SYSTEM:VAXVMSSYS.PAR`. ♦

- **filespec**—Write parameters to a file. The default file type is `.PAR` and you need write access to the file.

SYSMAN PARAMETERS WRITE

Qualifiers

None.

Description

The **PARAMETERS WRITE** command writes the system parameter values and the name of the site-independent startup command procedure from the work area to the active system in memory, the current system parameter file on disk, or your choice of a parameter file. You can write only dynamic parameter values to the active system.

Both the **PARAMETERS WRITE ACTIVE** and **PARAMETERS WRITE CURRENT** commands send a message to OPCOM to record the event.

Examples

1. **SYSMAN> PARAMETERS WRITE SYS\$SYSTEM:SPECIAL**

The command in this example creates a new parameter specification file.

2. **SYSMAN> PARAMETERS WRITE CURRENT**

The command in this example modifies the current system parameter file on disk (**SYS\$SYSTEM:ALPHAVMSSYS.PAR**).

SET ENVIRONMENT

Defines the nodes or VMScluster to which subsequent commands apply.

Requires **OPER** or **SETPRV** privilege on all nodes in the target environment.

Format

SET ENVIRONMENT

Parameters

None.

Qualifiers

/CLUSTER

Specifies that all subsequent commands apply to all nodes in the VMScluster. By default, the management environment is the local VMScluster. Specify a nonlocal VMScluster by naming one cluster member with the **/NODE** qualifier.

/NODE=(node1,node2,...)

Specifies that **SYSMAN** execute subsequent commands on the given DECnet nodes. If accompanied by the **/CLUSTER** qualifier, the environment becomes the VMScluster where the given DECnet node is a member. A node name can be a system name, cluster alias, or logical name. However, before you can use logical names to define the command environment, you must set up the logical name table **SYSMAN\$NODE_TABLE**. For more information, see **DEFINE**.

/USERNAME=username

Specifies that this user name should be used for access control purposes on another node. You can use this qualifier only in conjunction with the /CLUSTER or /NODE qualifiers. SYSMAN uses the current user name if none is supplied. SYSMAN prompts for a password whenever you specify a new user name.

Description

The SET ENVIRONMENT command defines the target nodes or VMScluster for subsequent commands. When invoked, the system management environment is the local node where you are running SYSMAN. You can change the environment to any other nodes in the VMScluster, the entire VMScluster, or any nodes or VMScluster available through DECnet.

Designate a VMScluster environment with the /CLUSTER qualifier. When specifying a nonlocal VMScluster, also include the /NODE qualifier to identify the VMScluster.

If your environment consists of VAX and Alpha nodes, see the DO command for information about creating logicals to manage each platform as an environment.

You can display the current environment with the command SHOW ENVIRONMENT. To adjust privileges and defaults for the current environment, use the SET PROFILE command.

An environment exists until you exit from SYSMAN or establish another command context with the SET ENVIRONMENT command.

Examples

1. SYSMAN> SET ENVIRONMENT/CLUSTER
%SYSMAN-I-ENV, Current command environment:
Clusterwide on local cluster
Username ALEXIS will be used on nonlocal nodes

The commands in this example define the command environment as the local VMScluster. SYSMAN confirms the new environment.

2. SYSMAN> SET ENVIRONMENT/NODE=NODE21/CLUSTER
Remote Password:
%SYSMAN-I-ENV, Current command environment:
Clusterwide on remote node NODE21
Username ALEXIS will be used on nonlocal nodes

The command in this example establishes a management environment on the VMScluster where NODE21 is a member. SYSMAN prompts for a password because it is a nonlocal environment.

3. SYSMAN> SET ENVIRONMENT/NODE=(NODE21,NODE22,NODE23)
%SYSMAN-I-ENV, Current command environment:
Individual nodes: NODE21,NODE22,NODE23
Username ALEXIS will be used on nonlocal nodes

The command in this example defines the management environment to be three individual nodes.

SYSMAN SET ENVIRONMENT

```
4. $ CREATE/NAME_TABLE/PARENT=LN$SYSTEM_DIRECTORY -
   _$ SYSMAN$NODE_TABLE
   $ DEFINE LAVCS SYS1,SYS2,SYS3,SYS4/TABLE=SYSMAN$NODE_TABLE
   $ RUN SY$SYSTEM:SYSMAN
SYSMAN> SET ENVIRONMENT/NODE=(LAVCS)
%SYSMAN-I-ENV, Current command environment:
      Individual nodes: SYS1,SYS2,SYS3,SYS4
      Username ALEXIS will be used on nonlocal nodes
```

The commands in this example set up the logical name table SYSMAN\$NODE_TABLE, define a logical name (LAVCS), and use the logical name to define the command environment.

SET PROFILE

Temporarily modifies a user's current privileges and default device and directory.

Format

SET PROFILE

Parameters

None.

Qualifiers

/DEFAULT=device:[directory]

Specifies the default disk device and directory name that the system should use in this environment to locate and catalog files.

/PRIVILEGES=(priv1,priv2...)

Specifies the privileges to add to the current privileges. Any enhanced privileges must be authorized.

/VERIFY

/NOVERIFY (default)

Specifies whether you want DCL verification (both procedure and image) for future DO commands.

Description

The SET PROFILE command modifies process attributes for the current management environment. After considering the privilege requirements of commands that you intend to use in an environment, you can add or delete current privileges, if they are authorized. You can also set a new default device and directory, as well as use the SET PROFILE/[NO]VERIFY command to control DCL command verification in SYSMAN. Other attributes of your process remain constant. The profile is in effect until you change it, reset the environment, or exit from SYSMAN. The *OpenVMS System Manager's Manual* discusses profile changes in more detail.

Examples

1. SYSMAN> SET PROFILE/DEFAULT=WORK1:[ALEXIS]

The command in this example changes the default device and directory in the user account to directory ALEXIS on device WORK1.

2. SYSMAN> SET PROFILE/PRIVILEGES=(SYSPRV,CMKRNL)/VERIFY

The command in this example makes the authorized privileges, SYSPRV and CMKRNL, part of the current privileges, and turns on DCL verification. The privileges remain in effect until the environment changes, you enter another SET PROFILE command, or you exit.

SET TIMEOUT

Establishes the amount of time SYSMAN waits for a node to respond. Once the time limit expires, SYSMAN proceeds to execute the command on the next node in the environment.

Format

SET TIMEOUT time

Parameter

time

Specifies a delta time value, which has the following format:

hh:mm:ss[.cc.]

This is the amount of time that SYSMAN waits for a node to respond. SYSMAN waits indefinitely—by default it has no timeout period. See the *OpenVMS User's Manual* for a description of delta time values.

Qualifiers

None.

Example

```
SYSMAN> SET TIMEOUT 00:00:30
%SYSMAN-I-TIMEVAL, timeout value is 00:00:30
SYSMAN> CONFIGURATION SHOW TIME
System time on node NODE21: 19-JUN-1994 14:22:33
%SYSMAN-I-NODERR, error returned from node NODE22
%SMI-E-TIMEOUT, remote operation has timed out
System time on node NODE23: 19-JUN-1994 14:23:15
```

The command in this example establishes a timeout period of 30 seconds. Because NODE22 did not respond within 30 seconds, SYSMAN displays an error message and proceeds to execute the command on the next node in the environment.

SHOW ENVIRONMENT

Displays the target nodes or VMScluster where SYSMAN is executing commands.

Format

SHOW ENVIRONMENT

Parameters

None.

Qualifiers

None.

Description

The SHOW ENVIRONMENT command displays the current management environment. It can be the local VMScluster, local or remote nodes, or a nonlocal VMScluster. SYSMAN indicates if the environment is limited to individual nodes or if it is clusterwide. It also shows the current user name.

The environment exists until you exit from SYSMAN or enter another SET ENVIRONMENT command.

Examples

1. SYSMAN> SHOW ENVIRONMENT
%SYSMAN-I-ENV, Current command environment:
Clusterwide on local cluster
Username ALEXIS will be used on nonlocal nodes

The command in this example shows the current environment is the local VMScluster. User name ALEXIS will be used on other nodes in the cluster.

2. SYSMAN> SHOW ENVIRONMENT
%SYSMAN-I-ENV, Current command environment:
Clusterwide on remote cluster NODE21
Username ALEXIS will be used on nonlocal nodes

The command in this example shows that the command environment is a nonlocal VMScluster where NODE21 is a member.

3. SYSMAN> SHOW ENVIRONMENT
%SYSMAN-I-ENV, Current command environment:
Individual nodes: NODE22,NODE23
At least one node is not in local cluster
Username ALEXIS will be used on nonlocal nodes

The command in this example shows that the command environment consists of two nodes.

SHOW KEY

Displays key definitions created with the DEFINE/KEY command.

Format

SHOW KEY [key-name]

Parameter

key-name

Specifies the name of the key whose definition you want displayed. See the DEFINE/KEY command for a list of valid key names.

Qualifiers

/ALL

Displays all the key definitions in the specified state or states. Specifying a key name is not necessary.

/BRIEF

Displays only the key definition. By default, the system displays all the qualifiers associated with the key definition, including any specified state, unless you use the /BRIEF qualifier.

/DIRECTORY

Displays the names of all the states for which you have defined keys. If you have not defined keys, the SHOW KEY/DIRECTORY command displays the DEFAULT and GOLD states (which is the default SYSMAN keypad).

/STATE=(state, state...)

Specifies the name of a state for which the specified key definitions are to be displayed. If you select more than one state name, separate them with commas and enclose the list in parentheses.

Description

Specifies the name of the key whose definition you want displayed. See the DEFINE/KEY command for a list of valid key names.

Example

```
SYSMAN> SHOW KEY/ALL
DEFAULT keypad definitions:
  KP0 = "SHOW ENVIRONMENT" (echo)
  KP1 = "SHOW PROFILE" (echo)
SYSMAN>
```

The SHOW KEY command in this example displays all of the key definitions currently in effect.

SHOW PROFILE

Displays the privileges and the default device and directory being used in the current environment.

Format

SHOW PROFILE

Parameters

None.

Qualifiers

/DEFAULT

Displays the default disk device and directory name that the system uses in this environment to locate and catalog files.

/PRIVILEGES

Displays only the privileges in effect for the current environment.

Description

The SHOW PROFILE command displays the privileges and the default device and directory that is being used in the current environment. You can modify these attributes with the SET PROFILE command.

These values remain in effect until you change environments or enter another SET PROFILE command.

Example

```
SYSMAN> SHOW PROFILE
%SYSMAN-I-DEFDIR, Default directory on node NODE21 -- WORK1:[BERGERON]
%SYSMAN-I-DEFPRIV, Process privileges on node NODE21 --
    TMPMGX
    OPER
    NETMBX
    SYSPRV
```

The command in this example shows the default device and directory as well as current privileges.

SHOW TIMEOUT

Displays the amount of time SYSMAN waits for a node to respond. By default, there is no timeout period.

Format

SHOW TIMEOUT

Parameter

None.

Qualifiers

None.

Example

```
SYSMAN> SHOW TIMEOUT
%SYSMAN-I-TIMEVAL, timeout value is 00:00:04.00
```

The SHOW TIMEOUT command in this example displays the current timeout value, which is 4 seconds.

SHUTDOWN NODE

Shuts down one or more nodes in a VMScluster.

Requires SETPRV privilege or all of the following privileges:
CMKRNL, EXQUOTA, LOG_IO, OPER, SYSNAM, SYSPRV, TMPMBX, WORLD.

Format

SHUTDOWN NODE

Parameters

None.

Qualifiers

/AUTOMATIC_REBOOT

/NOAUTOMATIC_REBOOT(default)

Reboots the system automatically when the shutdown is complete.

/CLUSTER_SHUTDOWN

/NOCLUSTER_SHUTDOWN(default)

Shuts down the entire VMScluster.

When you use the /CLUSTER_SHUTDOWN option, each node suspends activity just short of shutting down completely, until all other nodes in the cluster have reached the same point in the shutdown procedure.

You must specify this option on every VMScluster node. If any one node is not shut down completely, the cluster-wide shutdown cannot occur.

You should use the SET ENVIRONMENT/CLUSTER command before you issue a SHUTDOWN NODE/CLUSTER_SHUTDOWN command to insure that all nodes in the VMScluster are shutting down.

/DISABLE_AUTOSTART

Specifies the number of minutes before shutdown when autostart queues running on the node are marked stop pending and are subject to failover to another node.

SYSMAN SHUTDOWN NODE

Using this qualifier gives you control over when the autostart failover process begins. By default, the value equals that of the `/MINUTES_TO_SHUTDOWN` qualifier.

Determine the appropriate number of minutes for your configuration by weighing a smoother transition against completing a maximum number of jobs before shutdown. The larger the value, the smoother the transition will be. The smaller the value, the more jobs will execute on the node.

/INVOKE_SYSHUTDOWN(default)

/NOINVOKE_SYSHUTDOWN

Invokes a site-specific shutdown procedure.

/MINUTES_TO_SHUTDOWN=number

The number of minutes until shutdown occurs. If the system logical name `SHUTDOWN$MINIMUM_MINUTES` is defined, its integer value is the minimum value that you can enter. Therefore, if the logical name is defined as 10, you must specify at least 10 minutes to final shutdown or an error message displays. If the logical name is not defined, and you do not enter a value, 0 minutes is the default.

/REASON=text

The reason for the shutdown (one line).

/REBOOT_CHECK

/NOREBOOT_CHECK(default)

Checks for basic operating system files and notifies you if any are missing. Be sure to replace missing files before rebooting.

/REBOOT_TIME=time

The time when you expect to reboot the system such as `IMMEDIATELY`, `IN 10 MINUTES`, `2 P.M.`, or `14:00:00`. Shutdown displays this time in a shutdown message to users.

/REMOVE_NODE

/NOREMOVE_NODE(default)

Removes a node from the active VMScluster quorum. Use this qualifier when you do not expect the shut-down node to rejoin the VMScluster for an extended period.

When you use the `REMOVE_NODE` option, active quorum in the remainder of the cluster is adjusted downward to reflect the fact that the removed node's votes no longer contribute to the quorum value. The shutdown procedure readjusts the quorum by issuing the `SET CLUSTER/EXEPECTED_VOTES` command.

You can reset options by using the following command:

```
SYSMAN> STARTUP OPTIONS/NOVERIFY/NOCHECKPOINTING
```

For more information on VMScluster management, see *VMScluster Systems for OpenVMS*.

/SAVE_FEEDBACK

/NOSAVE_FEEDBACK(default)

Records feedback data collected from the system since it was last booted and creates a new version of the AUTOGEN feedback data file, which you can use the next time you run AUTOGEN.

/SPIN_DOWN_DISKS

/NOSPIN_DOWN_DISKS(default)

Spins down disks. You cannot spin down the system disk.

Description

The SHUTDOWN NODE command invokes SYS\$SYSTEM:SHUTDOWN to shut down one node or multiple nodes, as you specify. You can enter the shutdown command in one command line, rather than engaging in an interactive dialogue with SHUTDOWN.COM.

Because SYSMAN enables you to define the target environment, you can perform a shutdown on your local node, your own VMScluster, or a subset of nodes on your VMScluster. If you are shutting down a local node, SYSMAN does not require you to remain logged in to the system during the shutdown, as long as you set the environment to the local node. See the SHUTDOWN NODE command examples and SET ENVIRONMENT for more information.

The shutdown procedure carries out the following events:

1. At decreasing time intervals, broadcasts a message to users to log out.
2. Defines the system logical SHUTDOWN\$TIME to reflect the value entered with the /MINUTES_TO_SHUTDOWN qualifier. For example, if you entered /MINUTES_TO_SHUTDOWN=10 at 12:00, the shutdown time would be 12:10.

To see if a shutdown is in progress or determine the actual time for shutdown, use the command SHOW LOGICAL SHUTDOWN\$TIME.

3. At six minutes or less before shutdown, makes the device from which the shutdown procedure was invoked the operator console and disables all nonoperator logins. If DECnet is running, it is shut down.
4. At one minute before shutdown, stops batch and device queues and the system job queue manager.
5. At zero minutes before shutdown, invokes the site-specific command procedure SYS\$MANAGER:SHUTDWN.COM.
6. Stops all user processes; however, system processes continue. Ancillary control processes (ACPs) may delete themselves when their mounted volumes are finally dismounted.
7. Stops the secondary processor on dual-processor systems.
8. Removes all installed images.
9. Dismounts volumes and spins down disks, if you requested it. Does not spin down the system disk and the quorum disk, if a quorum disk is present.
10. Closes the operator's log file.
11. Invokes SYS\$SYSTEM:OPCRASH to shut down the system.
12. Displays the following message if you did not request an automatic reboot:

SYSTEM SHUTDOWN COMPLETE - USE CONSOLE TO HALT SYSTEM

If you requested an automatic reboot, the system reboots, provided the necessary controls are set.

SYSMAN SHUTDOWN NODE

Examples

1.

```
SYSMAN> SHUTDOWN NODE/MINUTES_TO_SHUTDOWN=15/REBOOT_TIME="later"-  
_SYSMAN> /REASON="SOFTWARE UPGRADE"/REBOOT_CHECK/CLUSTER_SHUTDOWN
```

This example requests a shutdown for the entire VMSccluster and a reboot check for any missing operating system files. The following messages are displayed to users on the cluster:

```
SHUTDOWN message on NODE21, from user SYSTEM at NODE21$0PA0: 12:00:00:20  
NODE21 will shut down in 15 minutes; back up later. Please log off NODE21.  
SOFTWARE UPGRADE
```

```
SHUTDOWN message on NODE22, from user SYSTEM at NODE22$0PA0: 12:00:00:22  
NODE22 will shut down in 15 minutes; back up later. Please log off NODE22.  
SOFTWARE UPGRADE
```

```
SHUTDOWN message on NODE23, from user SYSTEM at NODE23$0PA0: 12:00:00:24  
NODE23 will shut down in 15 minutes; back up later. Please log off NODE23.  
SOFTWARE UPGRADE
```

2.

```
SYSMAN> SET ENVIRONMENT/NODE=0  
Password:  
SYSMAN> SHUTDOWN NODE/MINUTES=120  
%SYSMAN-I-SHUTDOWN, SHUTDOWN request sent to node  
SYSMAN> EXIT  
$ LOGOUT
```

This example shuts down the local node in 2 hours. As long as you set the environment to the local node, a subprocess of the SMISERVER system detached process runs shutdown, and remaining logged into the system during the shutdown is not necessary. If you do not set the environment to the local node, the shutdown runs via a subprocess of the current process, requiring that you remain logged in during the shutdown cycle.

SPAWN

Creates a subprocess of the current process. The context of the subprocess is copied from the current process. You can use the SPAWN command to leave SYSMAN temporarily, perform other tasks (such as displaying a directory listing or printing a file), and return to SYSMAN.

Note that SPAWN performs actions on the local node only. If you want to execute DCL commands or command procedures throughout your environment, use the DO command.

Requires TMPMBX or PRMMBX user privilege. The SPAWN command does not manage terminal characteristics. You cannot use the SPAWN and ATTACH commands if your terminal has an associated mailbox.

Format

SPAWN [command-string]

Parameter

command-string

Specifies a command string of fewer than 132 characters that you want executed in the context of the created subprocess. When the command completes execution, the subprocess terminates and control returns to the parent process. If you specify both a command string and the /INPUT qualifier, the command string executes before additional commands are obtained from the /INPUT qualifier.

Qualifiers

/INPUT=filespec

Specifies an input file containing one or more DCL command strings that you want executed by the spawned subprocess. If you specify a command string along with an input file, the command string gets processed before the commands in the input file. When processing is complete, the subprocess terminates.

/LOGICAL_NAMES (default)

/NOLOGICAL_NAMES

Specifies that the logical names of the parent process are copied to the subprocess. When you do not want the subprocess to use the logical names of the parent process, enter the /NOLOGICAL_NAMES qualifier.

/OUTPUT=filespec

Identifies the output file to which the results of the operation are written. Specify an output other than SYS\$OUTPUT whenever you use the /NOWAIT qualifier. This prevents output from being displayed while you are specifying new commands. If you omit the /OUTPUT qualifier, output gets written to the current SYS\$OUTPUT device.

/PROCESS=subprocess-name

Specifies the name of the subprocess that you want to create. The default subprocess name is in the format USERNAME_n.

/SYMBOLS (default)

/NOSYMBOLS

Determines whether the system passes DCL global and local symbols to the subprocess.

/WAIT

/NOWAIT

Controls whether the system waits until the subprocess completes before you can specify more commands. The /NOWAIT qualifier enables you to specify new commands while the specified subprocess is running. If you specify the /NOWAIT qualifier, use the /OUTPUT qualifier to direct the output to a file rather than displaying it on the screen. Doing this prevents your terminal from being used by more than one process simultaneously.

Description

The SPAWN command creates a subprocess of your current process with the following attributes copied from the parent process:

- All symbols except \$RESTART, \$SEVERITY, and \$STATUS
- Key definitions

- The current keypad state
- The current prompt string
- All process logical names and logical name tables except those explicitly marked CONFINE or those created in executive or kernel mode
- Default disk and directory
- Current SET MESSAGE settings
- Current process privileges
- Control and verification states

Note that some attributes, such as the process's current command tables, are not copied.

When the subprocess is created, the process-permanent open files and any image or procedure context are not copied from the parent process. The subprocess is set to command level 0 (DCL level with the current prompt).

If you do not specify the /PROCESS qualifier, the name of this subprocess is composed of the same base name as the parent process and a unique number. For example, if the parent process name is SMITH, the subprocess name can be SMITH_1, SMITH_2, and so on.

The LOGIN.COM file of the parent process is not executed for the subprocess because the context is copied separately, allowing quicker initialization of the subprocess. When the /WAIT qualifier is in effect, the parent process remains in hibernation until the subprocess terminates or returns control to the parent by way of the ATTACH command.

More than one process simultaneously attempts to use the same input or output stream when several processes share that stream and you do one of the following:

- Terminate a subprocess to which you are not currently attached.
- Terminate a process that is not spawned from the process to which you are currently attached.

Use the LOGOUT command to terminate the subprocess and return to the parent process. You can also use the ATTACH command (see ATTACH) to transfer control of the terminal to another process in the subprocess tree, including the parent process. (The SHOW PROCESS/SUBPROCESSES command displays the processes in the subprocess tree and points to the current process.)

Note

Because a tree of subprocesses can be established using the SPAWN command, you must be careful when terminating any process in the tree. When a process is terminated, all subprocesses below that point in the tree are automatically terminated.

Qualifiers used with the SPAWN command must directly follow the command verb. The command string parameter begins after the last qualifier and continues to the end of the command line.

Examples

1. SYSMAN> SPAWN DIR SYS\$MANAGER:SITE*.*

Directory CLU\$COMMON:[SYSMGR]

SITE\$STARTUP.COM;5

Total of 1 file.

SYSMAN>

The SPAWN command in this example enables you to enter the DIRECTORY command in DCL to see if a site-specific startup file is in the directory. After the DIRECTORY command executes, control returns to the parent process.

2. SYSMAN> SPAWN
\$ EDIT SITE\$STARTUP.COM

.

.

\$ LOGOUT

Process SYSTEM_1 logged out at 28-JUN-1994 10:05:17.24

SYSMAN>

This example shows how you can use the SPAWN command to leave SYSMAN and edit a file. The LOGOUT command returns you to SYSMAN.

3. SYSMAN> SPAWN /NOLOGICAL_NAMES SET HOST
_Node: NODE21

.

.

\$ LOGOUT

%REM-S-END, control returned to node _NODE22::

SPAWN>

This example shows how you can use the SPAWN command to create a subprocess in which you can SET HOST. When you want to leave NODE21, enter the LOGOUT command. The /NOLOGICAL_NAMES qualifier prevents the logical names of the parent process from being copied to the subprocess.

STARTUP ADD

Adds a component to the startup database.

Requires read (R) and write (W) access to the startup database.

Format

STARTUP ADD FILE filespec

Parameters

FILE

Adds a component to the startup database. SYSMAN modifies STARTUP\$STARTUP_LAYERED by default.

SYSMAN STARTUP ADD

filespec

Specifies which file to add to the startup database. Each component of the startup database must have a file type of COM or EXE and reside in SYS\$STARTUP.

Qualifiers

/CONFIRM

/NOCONFIRM (default)

Controls whether SYSMAN displays the file specification of each file before adding it to the startup database and requests you to confirm the addition. If you specify /CONFIRM, you must respond to the prompt with a Y (Yes) or a T (True) and press Return before the file is added. If you enter anything else, such as N or NO, the requested file is not added.

/LOG

/NOLOG

Controls whether the STARTUP ADD command displays the file specification of each file after it has been added.

/MODE=mode

Specifies the mode of execution for the file. Valid modes include DIRECT, SPAWN, BATCH, or ANY, as described in the *OpenVMS System Manager's Manual*.

/NODE=(node1,node2,...,noden)

Names the nodes within the VMScluster that run the file during startup. By default, a startup file executes on all nodes in the cluster.

/PARAMETER=(P1:arg1,P2:arg2,...,P8:arg8)

Specifies the parameters that are to be passed to the file during startup. Parameters that are omitted receive the default parameters defined by the system parameter STARTUP_Pn. If STARTUP_Pn is blank, "FULL" is used as parameter 1 (P1) and is passed by STARTUP.COM to each startup component file. If you want a blank P1 parameter given to a specific component file, use the command:

```
SYSMAN> STARTUP MODIFY FILE component.com/PARAM=P1:""
```

/PHASE=phase-name

Indicates the phase within system startup when the file is to be executed. Valid phases include LPBEGIN, LPMAIN, LPBETA, and END. LPMAIN is the default.

Description

The STARTUP ADD command adds a component to the startup database. Startup components are the command procedures or executable files that perform actual startup work. Files from the startup database are used to start the operating system, site-specific programs, and layered products. STARTUP\$STARTUP_VMS and STARTUP\$STARTUP_LAYERED list the components of the startup database.

Because a VMScluster typically shares one copy of the startup database, the SYSMAN environment can be defined as clustered or as a single node within the cluster.

Example

```
SYSMAN> STARTUP ADD FILE /MODE=DIRECT /PHASE=LPMAIN -
_SYSMAN> FOR$LPMAIN_043_STARTUP.COM
```

The STARTUP ADD command in this example adds a record to the startup database that starts FORTRAN Version 4.3.

STARTUP DISABLE

Prevents a file in the startup database from executing.

Requires read (R) and write (W) access to the startup database.

Format

STARTUP DISABLE FILE filespec

Parameters

FILE

Disables a component of the startup database. SYSMAN modifies STARTUP\$STARTUP_LAYERED by default.

filespec

Specifies the name of a component in the startup database. The startup file must reside in SYS\$STARTUP and have a file type of .COM or .EXE. The wildcard characters % and * are permitted.

Qualifiers

/CONFIRM

/NOCONFIRM (default)

Controls whether the STARTUP DISABLE command displays the file specification of each file before disabling it in the startup database and requests you to confirm that the file be disabled. If you specify /CONFIRM, you must respond to the prompt with a Y (Yes) or a T (True) and press Return before the file is disabled. If you enter anything else, such as N or NO, the requested file is not disabled.

/LOG

/NOLOG

Controls whether the STARTUP DISABLE command displays the file specification of each file after it has been disabled.

/NODE=(node1,node2,...,noden)

Identifies nodes within the VMScluster that do not run the file during startup. By default, the startup file is disabled on all nodes in the VMScluster.

/PHASE=phase-name

Indicates the phase of system startup in which the specified file normally executes. Valid phases include LPBEGIN, LPMAIN, LPBETA, and END. LPMAIN is the default.

SYSMAN STARTUP DISABLE

Description

The **STARTUP DISABLE** command prevents a file in the startup database from executing. The command edits a record in the startup database, temporarily disabling the file.

Example

```
SYSMAN> STARTUP DISABLE FILE /NODE=NODE21 FOR$LPMAIN_043_STARTUP.COM
```

The command in this example modifies the startup database so that **FORTTRAN** will not be installed on **NODE21**.

STARTUP ENABLE

Enables a previously disabled file in the startup database to execute during system startup.

Requires read (R) and write (W) access to the startup database.

Format

```
STARTUP ENABLE FILE filespec
```

Parameters

FILE

Enables a component of the startup database. **SYSMAN** modifies **STARTUP\$STARTUP_LAYERED** by default.

filespec

Specifies the name of the startup file that you are enabling. Wildcard characters are accepted.

Qualifiers

/CONFIRM

/NOCONFIRM (default)

Controls whether the **STARTUP ENABLE** command displays the file specification of each file before enabling it in the startup database and requests you to confirm that the file be enabled. If you specify **/CONFIRM**, you must respond to the prompt with a Y (Yes) or a T (True) and press Return before the file is enabled. If you enter anything else, such as N or NO, the requested file is not enabled.

/LOG

/NOLOG

Controls whether the **STARTUP ENABLE** command displays the file specification of each file after it has been enabled.

/NODE=(node1,node2,...,noden)

Names nodes within the **VMScluster** where the file will be enabled. By default, the startup file is enabled on all nodes.

/PHASE=phase-name

Indicates the phase within system startup when the specified file is to be enabled. Valid phases include LPBEGIN, LPMAIN, LPBETA, and END. LPMAIN is the default.

Description

The STARTUP ENABLE command permits a file that was previously disabled to execute during system startup.

Example

```
SYSMAN> STARTUP ENABLE FILE /NODE=NODE22 FOR$LPMAIN_043_STARTUP.COM
```

The command in this example modifies the startup database. NODE22 will have FORTRAN Version 4.3 installed at startup.

STARTUP MODIFY

Changes information associated with a startup file in the startup database.

Requires read (R) and write (W) access to the startup database.

Format

STARTUP MODIFY FILE filespec

Parameters

FILE

Modifies a record in the startup database. SYSMAN modifies STARTUP\$STARTUP_LAYERED by default.

filespec

Selects a startup file for modification. Wildcard characters are accepted.

Qualifiers

/CONFIRM

/NOCONFIRM (default)

Controls whether the STARTUP MODIFY command displays the file specification of each file before modifying its startup characteristics in the startup data file and requests you to confirm that the file characteristics be modified. If you specify /CONFIRM, you must respond to the prompt with a Y (Yes) or a T (True) and press Return before the file is modified. If you enter anything else, such as N or NO, the requested file is not modified.

/LOG

/NOLOG

Controls whether the STARTUP MODIFY command displays the file specification of each file after its startup characteristics have been modified.

/MODE=mode

Changes the mode of execution for a startup file. Valid modes include DIRECT, SPAWN, BATCH, or ANY, as described in the *OpenVMS System Manager's Manual*.

SYSMAN STARTUP MODIFY

/NAME=filespec

Changes the name of the startup file. The file must reside in SYS\$STARTUP.

/PARAMETER=(P1:arg1,P2:arg2,...,P8:arg8)

Changes the parameters that are to be passed to the file during startup. Parameters that are omitted receive the default parameters defined by the system parameter STARTUP_Pn. If STARTUP_Pn is blank, "FULL" is used as parameter 1 (P1) and is passed by STARTUP.COM to each startup component file. If you want a blank P1 parameter given to a specific component file, use the command:

```
SYSMAN> STARTUP MODIFY FILE component.com/PARAM=P1:""
```

/PHASE=phase-name

Selects startup files for modification based on the phase in which they run. Valid phases include LPBEGIN, LPMAIN, LPBETA, and END. LPMAIN is the default.

Description

The STARTUP MODIFY command edits startup information associated with components in the startup database. For example, the command can rename a file or change the parameters that are passed to a file during startup. You can select a group of files for modification based on the phase in which they run.

Example

```
SYSMAN> STARTUP MODIFY FILE FOR$LPMAIN_043_STARTUP.COM -  
_SYSMAN> /PARAM=(P3:TRUE,P4:FALSE) /CONFIRM
```

The command in this example changes two startup parameters for the command procedure FOR\$LPMAIN_043_STARTUP.COM.

STARTUP REMOVE

Removes a record in the startup database, so the specified startup file no longer executes during system startup.

Requires read (R) and write (W) access to the startup database.

Format

```
STARTUP REMOVE FILE filespec
```

Parameters

FILE

Removes a component from the startup database. SYSMAN modifies STARTUP\$STARTUP_LAYERED by default.

filespec

Specifies the name of the file to remove from the startup database. Wildcard characters are accepted.

Qualifiers

/CONFIRM

/NOCONFIRM (default)

Controls whether the STARTUP REMOVE command displays the file specification of each file before deleting its record in the startup database and requests you to confirm that the file be deleted. If you specify /CONFIRM, you must respond to the prompt with a Y (Yes) or a T (True) and press Return before the file is removed. If you enter anything else, such as N or NO, the requested file is not removed.

/LOG

/NOLOG

Controls whether SYSMAN displays the file specification of each file after it has been removed.

/PHASE=phase-name

Indicates the phase of system startup from which the file will be removed. Valid phases include LPBEGIN, LPMAIN, LPBETA, and END.

Example

```
SYSMAN> STARTUP REMOVE FILE FOR$LPMAIN_043_STARTUP.COM /LOG
```

The command in this example takes the file FOR\$LPMAIN_043_STARTUP.COM out of the startup database.

STARTUP SET DATABASE

Establishes the current startup database.

Format

```
STARTUP SET DATABASE database
```

Parameters

database

Specifies the name of the target database, which is STARTUP\$STARTUP_LAYERED by default. The second database, STARTUP\$STARTUP_VMS is available for viewing; however, Digital recommends that you do not modify it.

Qualifiers

None.

Example

```
SYSMAN> STARTUP SET DATABASE STARTUP$STARTUP_LAYERED
%SYSMAN-I-NEWCOMPFIL, current component file is now STARTUP$STARTUP_LAYERED
SYSMAN> STARTUP SHOW FILE
%SYSMAN-I-COMPFIL, contents of component database on node LUCERN
Phase    Mode    File
-----
LPBEGIN  DIRECT  VMS$LPBEGIN_050_STARTUP.COM
LPMAIN   DIRECT  FOR$LPMAIN_043_STARTUP.COM
```


SYSMAN STARTUP SET DATABASE

The commands in this example establish the layered products database as the default, so it can be displayed.

STARTUP SET OPTIONS

Displays startup status for one or more nodes in a VMSccluster during startup.

Requires READ (R) and WRITE (W) access to the current system parameter file on disk: SYS\$SYSTEM:VAXVMSSYS.PAR (for VAX systems) or SYS\$SYSTEM:ALPHAVMSSYS.PAR (for Alpha systems).

Format

STARTUP SET OPTIONS

Parameters

None.

Qualifiers

/CHECKPOINTING

/NOCHECKPOINTING

Displays information messages describing the time and status of each startup phase and component procedure.

/OUTPUT=FILE,CONSOLE(default)

Sends output generated by using the /VERIFY qualifier to a file or to the system console. If you choose the FILE option, it creates SYS\$SPECIFIC:[SYSEXE]STARTUP.LOG.

/VERIFY=FULL (default),PARTIAL

/NOVERIFY

Displays startup procedures as they execute. This qualifier defines the SYSGEN parameter STARTUP_P2 to have the appropriate value based on the options you choose:

- **FULL**—Displays every line of DCL executed by startup component procedures and by STARTUP.COM
- **PARTIAL**—Displays every line of DCL executed by startup component procedures, but does not display DCL executed by STARTUP.COM

Caution

All STARTUP_P* parameter values modified by the SYSMAN STARTUP OPTIONS will be overridden by the AUTOGEN command procedure. To preserve any parameter modifications made with SYSMAN, edit the SYS\$SYSTEM:MODPARAMS.DAT file, as explained in the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

Description

The **STARTUP SET OPTIONS** command enables you to perform logging and checkpointing during startup. You can control the amount of information logged (full or partial) and where it is displayed (file or console). You can also choose checkpointing, which displays information messages about the time and status of each phase during startup.

Because **SYSMAN** enables you to define the target environment, you can perform startup logging on your local node, your own **VMSccluster**, and a subset of nodes on your **VMSccluster**. See **SET ENVIRONMENT** for more information.

Example

```
SYSMAN> STARTUP SET OPTIONS/VERIFY=FULL/OUTPUT=FILE/CHECKPOINTING
```

This example requests startup logging with full verification, output to **SYS\$SPECIFIC:[SYSEXE]STARTUP.LOG**, and checkpointing.

STARTUP SHOW

Displays the name of the current startup database or its components as well as the startup logging options selected with the **STARTUP SET OPTIONS** command.

Format

```
STARTUP SHOW  DATABASE
               FILE
               OPTIONS
```

Parameters

DATABASE

Displays the name of the current startup database. The two startup databases are **STARTUP\$STARTUP_LAYERED** and **STARTUP\$STARTUP_VMS**. Digital recommends that you do not modify the **STARTUP\$STARTUP_VMS** database.

FILE

Displays the contents of the current startup database. The display includes the file name, phase, and mode of execution for each component in the database.

OPTIONS

Displays the options selected when using the **STARTUP SET OPTIONS** command.

Qualifiers

/FULL

Displays full information about each component in the database. In addition to the phase, file name, and mode of execution for each startup component, **SYSMAN** displays the nodes on which the file executes and the parameters passed to the file. This qualifier is relevant with the **FILE** parameter.

SYSMAN STARTUP SHOW

/NODE

Displays the nodes within the VMScluster on which the file executes. By default, a startup file executes on all nodes in an environment. This qualifier is relevant with the FILE parameter.

/OUTPUT=filespec

Redirects command output from SYS\$OUTPUT to the file named with the qualifier. Without a filespec, SYSMAN writes the output to SYSMAN.LIS in the current directory.

/PARAMETERS

Lists the parameters with which the startup file executes. Parameters that are not specified receive the defaults defined by the system parameter STARTUP_Pn. If STARTUP_Pn is blank, "FULL" is used as parameter 1 (P1) and is passed by STARTUP.COM to each startup component file. If you want a blank P1 parameter given to a specific component file, see the /PARAMETER qualifier under STARTUP MODIFY for instructions.

/PHASE=phase-name

Displays components that execute in a specific phase of system startup. Valid phases include LPBEGIN, LPMAIN, LPBETA, and END. LPMAIN is the default. This qualifier is relevant with the FILE parameter.

Example

```
SYSMAN> STARTUP SET DATABASE STARTUP$STARTUP_VMS
SYSMAN> STARTUP SHOW FILE
%SYSMAN-I-COMPFIL, contents of component database on node LUCERN
Phase      Mode      File
-----
BASEENVIRON DIRECT  VMS$BASEENVIRON_050_LIB.COM
BASEENVIRON CALLED  VMS$BASEENVIRON_050_SMISERVER.COM
BASEENVIRON DIRECT  VMS$BASEENVIRON_050_VMS.COM
.
.
.
```

The commands in this example display the contents of the startup database.

SYS_LOADABLE ADD

Adds an entry in the system images file SYS\$UPDATE:VMS\$SYSTEM_IMAGES.IDX.

Caution

The SYS_LOADABLE ADD command is not intended for general use. Only advanced system programmers should use this command.

Format

SYS_LOADABLE ADD product image

Parameter

product

A 1- to 8-character product mnemonic that uniquely identifies a loadable image. For user-written images, this should typically contain the string `_LOCAL_`.

image

The file name of the system loadable image you want to add. A file name is the only value you can specify for this parameter. Do not specify a device, directory, file type, or wildcard characters.

Qualifiers

/LOAD_STEP

Indicates the step of the booting process at which you want the image loaded. Valid load steps are `INIT` (which causes the system initialization code to load the image), and `SYSINIT` (which causes the `SYSINIT` process to load the image).

If you do not specify a value for the `/LOAD_STEP` qualifier, it defaults to `SYSINIT`.

/LOG

/NOLOG

Controls whether the `SYS_LOADABLE ADD` command displays a notification after the entry has been added.

/MESSAGE

Enables you to specify the text of a message that is displayed when the appropriate condition is met (see the `/SEVERITY` qualifier). The default message is "system image load failed".

/SEVERITY

Determines how the image load status will affect console output and booting progress. You can specify the following values for this qualifier:

- **FATAL**—If an error occurs loading the image, display the error message and `BUGCHECK` information.
- **INFORMATION**—Display the message and continue processing.
- **SUCCESS**—Continue even if loading the image produces an error. Does not display the message.
- **WARNING**—If an error occurs loading the image, display the error message and continue processing.

If you do not specify a value for the `/SEVERITY` qualifier, it defaults to `WARNING`.

Description

The `SYS_LOADABLE ADD` command adds an entry to the system images file `SYS$UPDATE:VMS$SYSTEM_IMAGES.IDX`. You can then process this file using the command procedure `SYS$UPDATE:VMS$SYSTEM_IMAGES.COM`. Processing the file with `VMS$SYSTEM_IMAGES.COM` generates a new system images data file that the system uses when it boots.

If the file `SYS$UPDATE:VMS$SYSTEM_IMAGES.IDX` does not exist, the `SYS_LOADABLE ADD` command creates a new one.

SYS_LOADABLE REMOVE

Removes an entry in the system images file SYS\$UPDATE:VMS\$SYSTEM_IMAGES.IDX.

Caution

The SYS_LOADABLE REMOVE command is not intended for general use. Only advanced system programmers should use this command.

Format

SYS_LOADABLE REMOVE **product**
 image

Parameter

product

A 1- to 8-character product mnemonic that uniquely identifies a loadable image. For user-written images this should typically contain the string _LOCAL_.

image

The file name of the system loadable image you want to remove. A file name is the only value you can specify for this parameter. Do not specify a device, directory, file type, or wildcard characters.

Qualifiers

/LOG

/NOLOG

Controls whether the SYS_LOADABLE REMOVE command displays a notification after the entry has been removed.

Description

The SYS_LOADABLE REMOVE command removes an entry from the system images file SYS\$UPDATE:VMS\$SYSTEM_IMAGES.IDX. You can then process this file using the command procedure SYS\$UPDATE:VMS\$SYSTEM_IMAGES.COM. Processing the file with VMS\$SYSTEM_IMAGES.COM generates a new system images data file that the system uses when it boots.

If the file SYS\$UPDATE:VMS\$SYSTEM_IMAGES.IDX does not exist, the SYS_LOADABLE REMOVE command creates a new, empty one.

Supplemental MONITOR Information—Record Formats

The following sections describe the MONITOR record formats.

A.1 The MONITOR Recording File

Binary performance data is written into the MONITOR recording file when a MONITOR request indicates recording. A record is written to this file once per interval for each requested class. The record contains a predefined set of data for each of the requested performance classes.

The recording file is created when a MONITOR request is initiated, and is closed when the request terminates. The MONITOR recording file may be used as a source file to format and display the data on a terminal, to create a summary file, or to record a new recording file with different characteristics.

Note

The record formats described in this section are subject to change without notice at any future OpenVMS release.

The MONITOR recording file is an OpenVMS RMS sequential file with variable-length records. Each record in the file begins with a 1-byte type field. The remaining fields are different in length and format for each record type. Following are the three categories of record types:

- Customer control record
- Digital control record
- Class record

Customer control records may appear anywhere in the recording file. They are not generated by MONITOR and are ignored by MONITOR when it reads the file.

The first records in the MONITOR recording file, excluding customer control records, are Digital control records. The beginning of the file has three types of Digital control records: the file header record, the system information record, and the record RMS file name record. Node transition records are also control records, but can appear anywhere in the file.

Class records, which contain data on requested performance classes, follow the Digital control records. The class record is generally written once per interval for each class being recorded. An exception to this rule occurs when several class records are required to contain data for a single class over a single interval. This can occur for the PROCESSES class when too many processes exist to be accommodated by the maximum record size.

Supplemental MONITOR Information—Record Formats

A.1 The MONITOR Recording File

Unique numbers are assigned to each MONITOR record type. Record type numbers 0–127 are reserved for class records; numbers 128–191 are reserved for Digital control records; numbers 192–255 are reserved for customer control records.

MONITOR generates 29 record types. Table A–1 lists the MONITOR record types and their numbers, with associated class types. (For an explanation of MONITOR class types, refer to Section A.4.1.)

Table A–1 MONITOR Record Types

| Record Type | Type Number | Class Type |
|-------------------------|-------------|------------|
| File Header | 128 | |
| System Information | 129 | |
| Node Transition | 130 | |
| RMS File Name | 131 | |
| PROCESSES Class | 0 | component |
| STATES Class | 1 | system |
| MODES Class | 2 | component |
| PAGE Class | 3 | system |
| IO Class | 4 | system |
| FCP Class | 5 | system |
| POOL Class ¹ | 6 | system |
| LOCK Class | 7 | system |
| DECNET Class | 8 | system |
| RESERVED | 9 | system |
| RESERVED | 10 | system |
| FILE_SYSTEM_CACHE Class | 11 | system |
| DISK Class | 12 | component |
| RESERVED | 13 | component |
| DLOCK Class | 14 | system |
| SCS Class | 15 | component |
| RESERVED | 16 | system |
| SYSTEM Class | 17 | system |
| RESERVED | 18 | system |
| CLUSTER Class | 19 | system |
| RMS Class | 20 | component |
| MSCP_SERVER Class | 21 | system |
| TRANSACTION Class | 22 | system |
| VECTOR Class | 23 | component |
| VBS Class | 24 | system |

¹POOL class information is available only in pre-Version 6.0 MONITOR recording files.

A.2 Conventions

The following sections define the contents of each field within each record type. Record type and record size are given in decimal representation. References to system time indicate time values in system time format (64-bit format).

The field offset names listed are not defined within MONITOR. However, Digital recommends that you define and use these offset names when you work with MONITOR output records.

Following is the suggested naming convention for the field offset names:

MNR_CCC\$X_DDDDD

CCC is a record type or class mnemonic.

X is a 1-letter code indicating the size of the data item, as follows:

- B for byte
- W for word
- L for longword
- Q for quadword
- O for octaword
- T for ASCII string

DDDDD is the name describing the data item.

In the following tables that describe the record fields, the size of the data is shown in parentheses following the description of the field contents.

A.3 Digital Control Records

The four types of Digital control records are:

- the file header record
- the system information record
- the node transition record
- the RMS file record

Each file has one header record, which contains information applicable to all classes of performance data contained in the file. It must be the first record (except for customer control records) in the file.

One system information record exists per node per file. The record contains information about the system being monitored and follows the header record in the file.

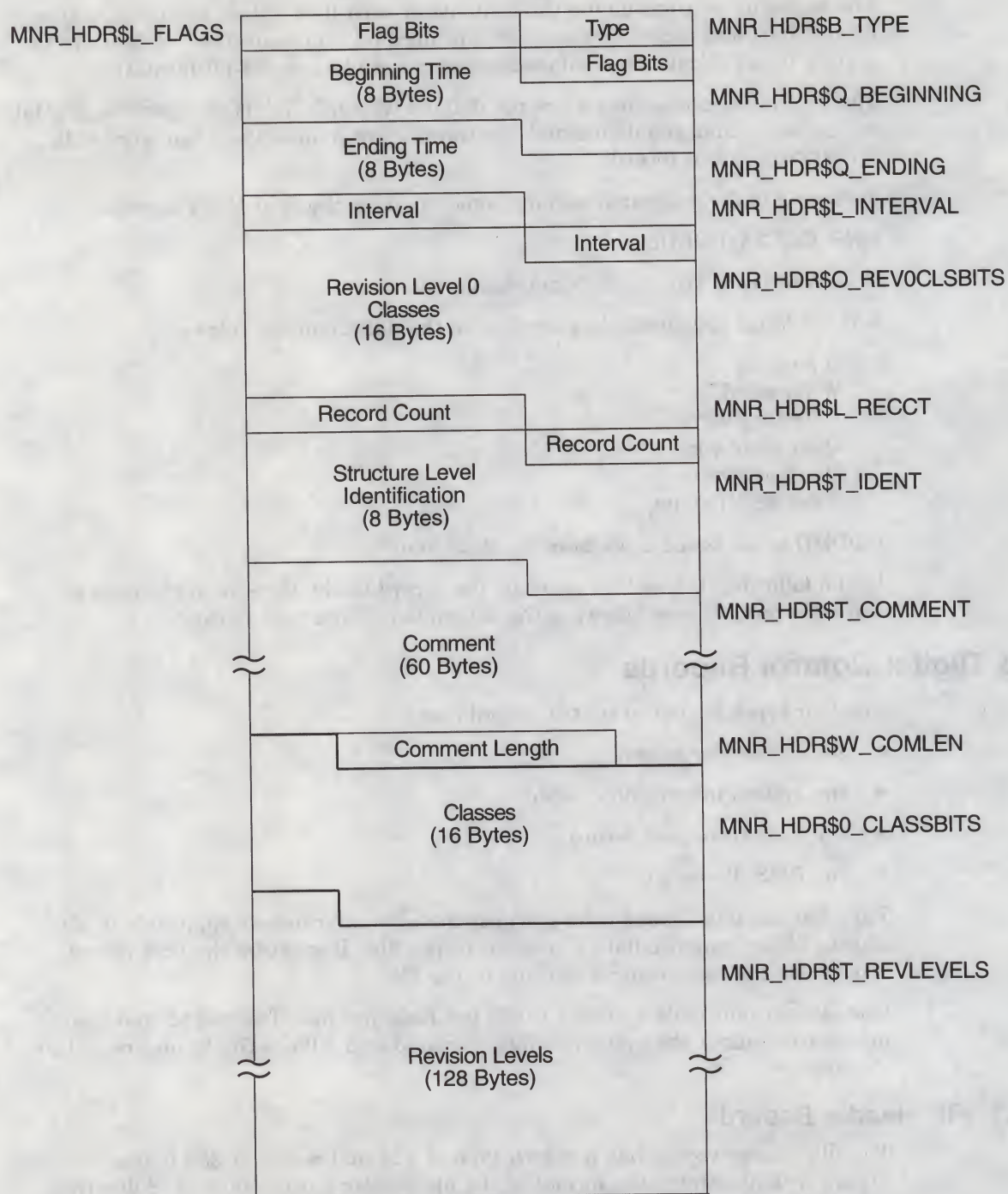
A.3.1 File Header Record

The file header record has a record type of 128 and a size of 259 bytes. Figure A-1 illustrates the format of the file header record; Table A-2 describes the fields in this record.

Supplemental MONITOR Information—Record Formats

A.3 Digital Control Records

Figure A-1 File Header Record Format



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Supplemental MONITOR Information—Record Formats

A.3 Digital Control Records

Table A-2 Descriptions of File Header Record Fields

| Field | Symbolic Offset | Contents |
|------------------|------------------------|---|
| Type | MNR_HDR\$B_TYPE | Record type identifier (1 byte). |
| Flags | MNR_HDR\$L_FLAGS | Total of 32 flag bits; low-order bit = bit 0. All flags reserved to Digital for future use (1 longword). |
| Beginning | MNR_HDR\$Q_BEGINNING | System time of beginning of recording (1 quadword). |
| Ending | MNR_HDR\$Q_ENDING | System time of end of recording (1 quadword). |
| Interval | MNR_HDR\$L_INTERVAL | Interval in seconds between collections; this is the value specified by the user in the recording request. It is not necessarily equal to the exact interval value obtained by subtracting two consecutive time-stamps for a given class (1 longword). |
| Revision Level 0 | MNR_HDR\$O_REV0CLSBITS | A 128-bit string representing all classes; a bit set to 1 indicates the presence in this file of a class which is at revision level 0 and whose type number corresponds to the bit number. Low-order bit = bit 0 (1 octaword). This field is provided for compatibility with Version 3.0 files. |
| Count | MNR_HDR\$L_RECCT | Count of all records in the file (1 longword). |
| ID | MNR_HDR\$T_IDENT | MONITOR Recording File Structure Level Identification (MON30050) (8 bytes). |
| Comment | MNR_HDR\$T_COMMENT | Recording file description supplied by the user, including trailing blanks (60 bytes). |
| Comment Length | MNR_HDR\$W_COMLEN | Actual length of recording file description string specified by the user (1 word). |
| Classes | MNR_HDR\$O_CLASSBITS | A 128-bit string representing all classes; a bit set to 1 indicates the presence in this file of the class whose type number corresponds to the bit number. Low-order bit = bit 0 (1 octaword). |
| Revision Levels | MNR_HDR\$T_REVLEVELS | A 128-byte string consisting of a 1-byte binary revision level number for each class. A class has a revision level of 0 initially. For each MONITOR release, if the record definition has changed, the revision level will be increased (not necessarily by 1). |

A.3.2 System Information Record

The system information record has a record type of 129 and a size of 47 bytes. Figure A-2 illustrates the format of the system information record; Table A-3 describes the fields in this record.

Supplemental MONITOR Information—Record Formats

A.3 Digital Control Records

Figure A-2 System Information Record Format

| | | | | |
|-------------------|--------------------------|----------|--------------|----------------------|
| MNR_SYI\$W_FLAGS | Flags | | Type | MNR_SYI\$B_TYPE |
| | Time Booted (8 Bytes) | | | MNR_SYI\$Q_BOOTTIME |
| | Max Proc Cnt | | | |
| MNR_SYI\$B_MPCPUS | | CPUs | Max Proc Cnt | MNR_SYI\$W_MAXPRCCNT |
| | Node Name (16 Bytes) | | | MNR_SYI\$T_NODENAME |
| | Bal Set Mem | | | |
| | MPW High Lim | | Bal Set Mem | MNR_SYI\$L_BALSETMEM |
| | CPU Type | | MPW High Lim | MNR_SYI\$L_MPWHILIM |
| MNR_SYI\$B_INDEX | CPU Conf | Index | CPU Type | MNR_SYI\$L_CPUTYPE |
| MNR_SYI\$B_VPCPUS | VPCPUS | CPU Conf | | MNR_SYI\$L_CPUCONF |
| | VP Conf | | | MNR_SYI\$L_VPCONF |

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Table A-3 Descriptions of System Information Record Fields

| Field | Symbolic Offset | Contents |
|--------------------|----------------------|---|
| Type | MNR_SYI\$B_TYPE | Type identifier (1 byte). |
| Flags | MNR_SYI\$W_FLAGS | Total of 16 flag bits; low-order bit = bit 0. If bit 0 is set to 1, the node on which the data was collected is a member of a VAXcluster. All other flags reserved to Digital for future use (1 word). |
| Time Booted | MNR_SYI\$Q_BOOTTIME | System time at which system booted. MONITOR calculates this time by taking the number of seconds since system boot, converting this to a negative value, and adding it to the current system time (1 quadword). |
| Max Process | MNR_SYI\$W_MAXPRCCNT | MAXPROCESSCNT system parameter value (1 word). |
| CPUs | MNR_SYI\$B_MPCPUS | Number of CPUs (1 byte). |
| Node Name | MNR_SYI\$T_NODENAME | Node name of node being monitored (counted ASCII string, 16 bytes). |
| Balance Set Memory | MNR_SYI\$L_BALSETMEM | Number of process pages to which memory can be allocated (1 longword). |
| MPW High Limit | MNR_SYI\$L_MPWHILIM | MPW_HILIMIT system parameter value (1 longword). |
| CPU Type | MNR_SYI\$L_CPUTYPE | CPU type code. Use \$PRDEF macro for code values (1 longword). |
| Index | MNR_SYI\$B_INDEX | Identifies the position of this node in several internal MONITOR data structures (1 byte). |
| CPU Config | MNR_SYI\$L_CPUCONF | Bit mask defining the location of each CPU in a multiprocessor (1 longword). |

(continued on next page)

Supplemental MONITOR Information—Record Formats

A.3 Digital Control Records

Table A-3 (Cont.) Descriptions of System Information Record Fields

| Field | Symbolic Offset | Contents |
|--------------------|-------------------|---|
| VPCPU _s | MNR_SYI\$B_VPCPUS | Number of vector-present processors in the current system (1 byte). |
| VP Conf | MNR_SYI\$L_VPCONF | Bit mask identifying the vector-present processors in the configuration (1 longword). |

A.3.3 Node Transition Record

The node transition record has a record type of 130 and a size of 2 bytes. Figure A-3 illustrates the format of the node transition record; Table A-4 describes the fields in this record.

Figure A-3 Node Transition Record Format



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Table A-4 Descriptions of Node Transition Record Fields

| Field | Symbolic Offset | Contents |
|-------|------------------|--|
| Type | MNR_NTR\$B_TYPE | Record type identifier—indicates node removal operation (1 byte). |
| Index | MNR_NTR\$B_INDEX | Identifies the position of this node in several internal MONITOR data structures (1 byte). |

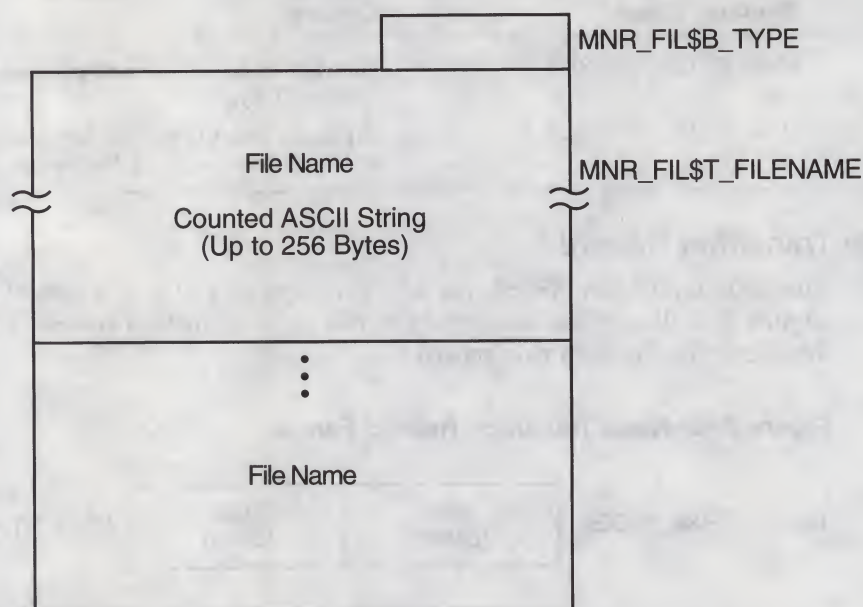
A.3.4 RMS File Record

The RMS file record has a record type of 131 and a variable size that depends on the number of RMS files and length of the file name string. Figure A-4 illustrates the format of the RMS file record; Table A-5 describes the fields in this record.

Supplemental MONITOR Information—Record Formats

A.3 Digital Control Records

Figure A-4 RMS File Record Format



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Table A-5 Descriptions of RMS File Record Fields

| Field | Symbolic Offset | Contents |
|----------|---------------------|---|
| Type | MNR_FIL\$B_TYPE | Record type identifier (1 byte). |
| Filename | MNR_FIL\$T_FILENAME | A counted ASCII string that identifies the RMS file for MONITOR RMS requests (up to 256 bytes). |

A.4 Class Records

The MONITOR recording file contains one class record for each requested class for every collection interval, except for the PROCESSES class. (See Section A.4.2.12 for more information on the PROCESSES class records.) For example, if a MONITOR user requested to record five classes (excluding PROCESSES) for a duration of 100 collection intervals, the file would contain 500 class records. Class records occur in order of increasing type number within an interval. The first class record for a given interval follows the last class record for the previous interval.

A.4.1 Class Type Formats

The two basic class types are system classes and component classes. A class record for a system class generally consists of counts for systemwide activities (such as page faults), whereas a class record for a component class normally contains a count for each element of a measured activity (such as I/O operations for each disk in the system).

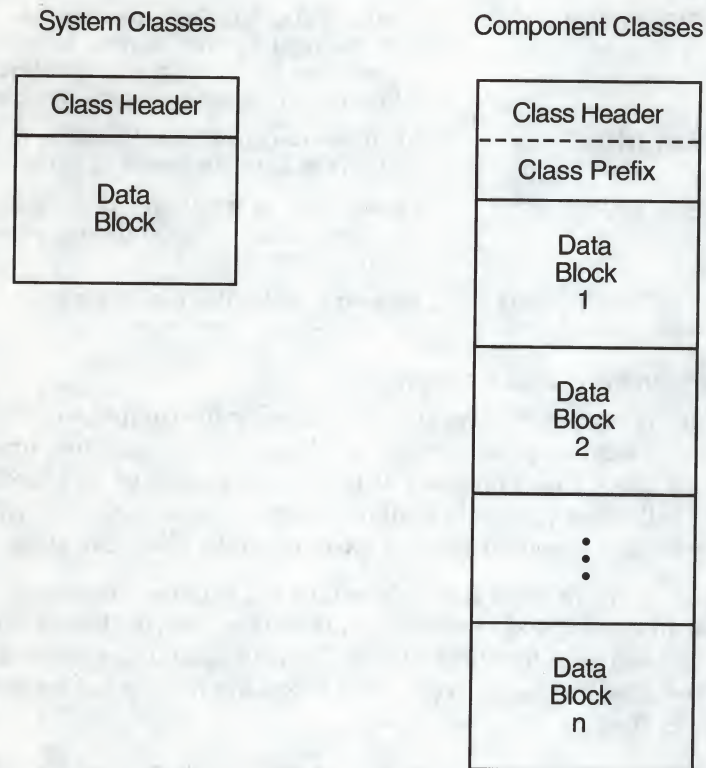
Specifically, a class record for a system class consists of a class header followed by a data block. A class record for a component class has a class header followed by a class prefix and one data block per element.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-5 illustrates the format for class records.

Figure A-5 Class Record Format



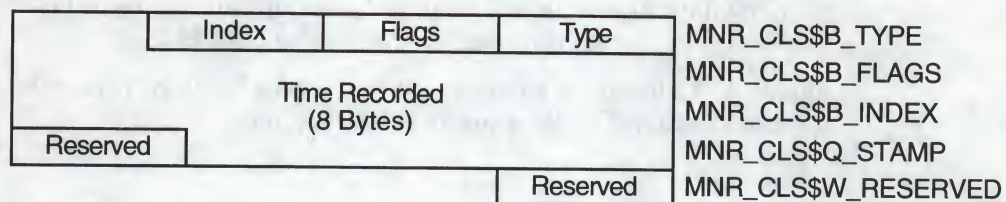
ZK-0968-GE

A.4.1.1 Class Header

The class header is the first part of every class record. Its format is independent of class. The class header is 13 bytes long.

Figure A-6 illustrates the format of the class header; Table A-6 describes the fields in the class header.

Figure A-6 Class Header Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-6 Descriptions of Class Header Fields

| Field | Symbolic Offset | Contents |
|----------|---------------------|---|
| Type | MNR_CLS\$B_TYPE | Record type identifier (1 byte). |
| Flags | MNR_CLS\$B_FLAGS | Total of 8 flag bits; low order bit = bit 0. If bit 0 is set to 1, the data for this interval continues in the next record. Can be set for the PROCESSES class only. All other flags reserved by Digital for future use (1 byte). |
| Index | MNR_CLS\$B_INDEX | Identifies the position of this node in several internal MONITOR data structures (1 byte). |
| Time | MNR_CLS\$Q_STAMP | System time at which this class record was recorded. The time value is nondecreasing across all class records in the file. |
| Reserved | MNR_CLS\$W_RESERVED | Reserved for Digital use (1 word). |

A.4.1.2 Class Prefix (Component Classes Only)

The class prefix always follows the class header for component class records. It contains data describing the number of elements (for example, processes for the PROCESSES class, disks for the DISK class) represented by the class records for the current collection interval. Unlike system class records, which have one data block per record, component classes have one data block per element.

One of the class prefix data items describes the number of elements (and therefore the number of data blocks) included in the class record. The other class prefix data item is used only for the PROCESSES class, and describes the number of processes included in the interval. The following discussion applies only to the PROCESSES class.

It is possible to monitor a number of processes so large that the required number of data blocks for one collection interval does not fit into a single maximum size record. In this case, the required number of PROCESSES class records is created to fully describe the processes.

All class headers in the set of PROCESSES class records for a given interval are identical, except for the setting of bit 0 in the MNR_CLS\$W_FLAGS field. This bit is set to 1 for all records except the last, for which it is set to 0.

The class prefixes in the set of class records vary, as described in Table A-7. The contents of the MNR_CMP\$L_ELTCT field depends on the number of data blocks contained in the record; the contents of the MNR_CMP\$L_PCTINT field remain constant for each record in the set. All records in the set except the last contain as many data blocks as will fit into the maximum size record (32000 bytes). The last record in the set contains the remaining data blocks.

Figure A-7 illustrates the class prefix format; Table A-7 describes the fields in the class prefix. The class prefix is 8 bytes long.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-7 Class Prefix Format

| | |
|-----------------------|-------------------|
| Elements in Record | MNR_CMP\$L_ELTCT |
| Processes in Interval | MNR_CMP\$L_PCTINT |

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Table A-7 Descriptions of Class Prefix Fields

| Field | Symbolic Offset | Contents |
|-----------------------|-------------------|--|
| Elements in Record | MNR_CMP\$L_ELTCT | Count of elements (data blocks) in this record (1 longword). |
| Processes in Interval | MNR_CMP\$L_PCTINT | Count of processes (data blocks) for this interval (1 longword). This field is for the PROCESSES class only. For other component classes, this longword is reserved to Digital for future use. |

A.4.2 Class Data Blocks

The size and format of each data block and the number of blocks per record depend on the class. System classes have one data block per record. Component classes have one data block per element. The fields within each block are performance data items.

The following sections describe the data items within the data block for each class. Every data item falls into one of three categories. It is either a count, a level, or an informational item. A count is a numeric quantity that increases at each succeeding interval for the duration of a system boot. A level is a numeric quantity that may increase or decrease at each succeeding interval. An informational item represents data that, rather than being a unit of performance measurement (as are the first two types), is descriptive in nature.

In the tables that follow, item types are identified by the letters C (count), L (level), and I (informational). Item types are shown in parentheses, following the length of the field. Class records are listed alphabetically.

A.4.2.1 CLUSTER Class Record

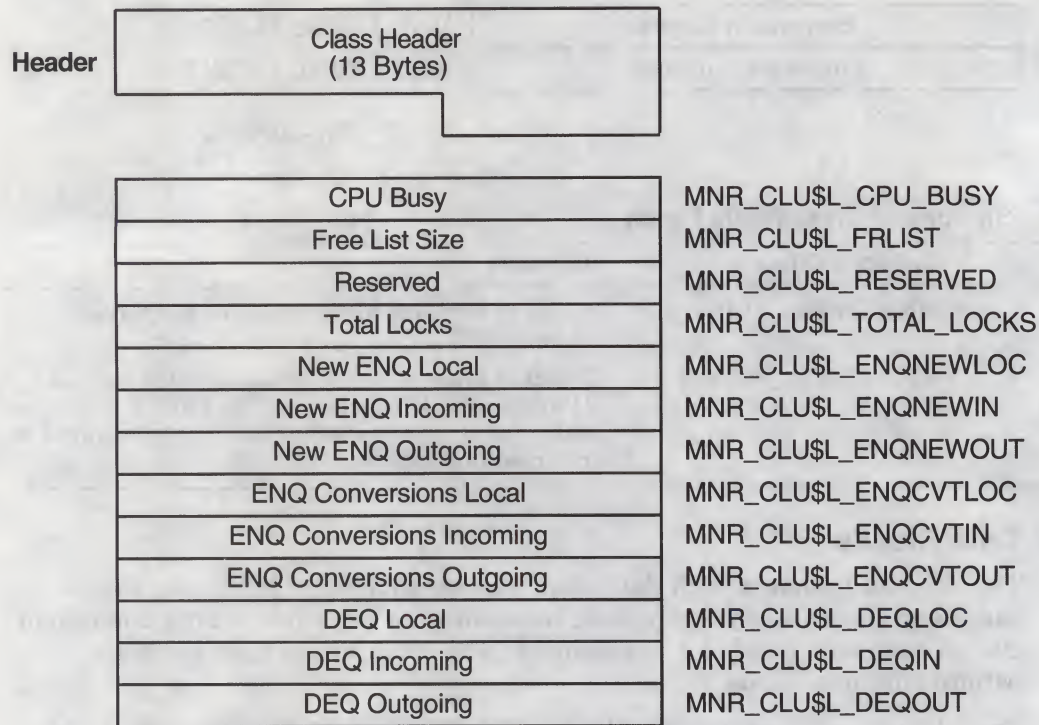
The CLUSTER class record contains data describing clusterwide CPU, memory, and locking activity. The CLUSTER class record has a record type of 19 and a size of 65 bytes. Note that when the CLUSTER class is recorded, the DISK and MODES classes are also recorded, even if not explicitly requested.

Figure A-8 illustrates the format of the CLUSTER class record. Table A-8 describes the fields in the data block for the CLUSTER class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-8 CLUSTER Class Record Format



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Table A-8 Descriptions of CLUSTER Class Record Fields

| Field | Symbolic Offset | Contents |
|------------------|------------------------|---|
| CPU Busy | MNR_CLU\$L_CPU_BUSY | Count of clock ticks (10-millisecond units) spent in all CPU modes since system was booted (longword,C) |
| Free List Size | MNR_CLU\$L_FRLIST | Number of pages currently on the free list (longword,L) |
| Reserved | MNR_CLU\$L_RESERVED | Reserved to Digital |
| Total Locks | MNR_CLU\$L_TOTAL_LOCKS | Total of all incoming, outgoing, and local ENQs, DEQs, and conversions (longword,C) |
| New ENQ Local | MNR_CLU\$L_ENQNEWLOC | Count of new lock requests that originate and are performed on the system (local) (longword,C) |
| New ENQ Incoming | MNR_CLU\$L_ENQNEWIN | Count of new lock requests that originate on other systems and are performed on this system (incoming) (longword,C) |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-8 (Cont.) Descriptions of CLUSTER Class Record Fields

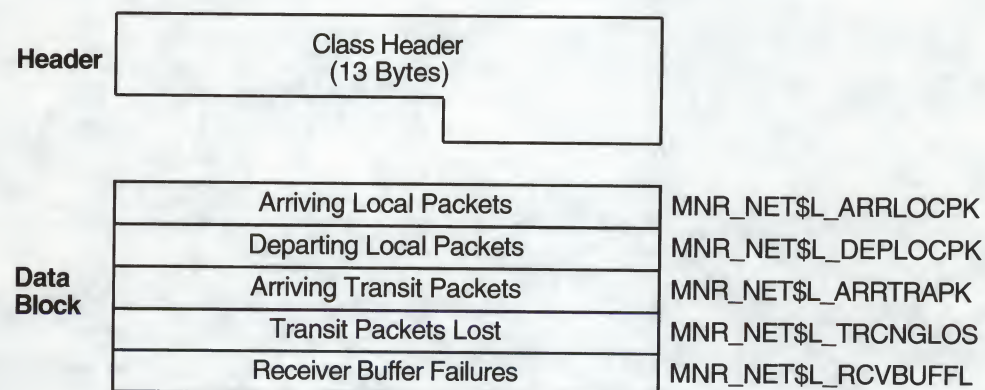
| Field | Symbolic Offset | Contents |
|--------------------------|----------------------|---|
| New ENQ Outgoing | MNR_CLU\$L_ENQNEWOUT | Count of new lock requests that originate on this system and are performed on other systems (outgoing) (longword,C) |
| ENQ Conversions Local | MNR_CLU\$L_ENQCVTLOC | Count of lock conversion requests (local) (longword,C) |
| ENQ Conversions Incoming | MNR_CLU\$L_ENQCVTIN | Count of lock conversion requests (incoming) (longword,C) |
| ENQ Conversions Outgoing | MNR_CLU\$L_ENQCVTOUT | Count of lock conversion requests (outgoing) (longword,C) |
| DEQ Local | MNR_CLU\$L_DEQLOC | Count of unlock requests (local) (longword,C) |
| DEQ Incoming | MNR_CLU\$L_DEQIN | Count of unlock requests (incoming) (longword,C) |
| DEQ Outgoing | MNR_CLU\$L_DEQOUT | Count of unlock requests (outgoing) (longword,C) |

A.4.2.2 DECNET Class Record

The DECNET class record contains data describing the operation of the DECnet for OpenVMS subsystem. The DECNET class record has a record type of 8 and a size of 33 bytes.

Figure A-9 illustrates the format of the DECNET class record. Table A-9 describes the fields in the data block for the DECNET class record.

Figure A-9 DECNET Class Record Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-9 Descriptions of DECNET Class Record Fields

| Field | Symbolic Offset | Contents |
|--------------------------|---------------------|--|
| Arriving Local Packets | MNR_NET\$L_ARRLOCPK | Count of arriving local packets (longword,C) |
| Departing Local Packets | MNR_NET\$L_DEPLOCPK | Count of departing local packets (longword,C) |
| Arriving Transit Packets | MNR_NET\$L_ARRTRAPK | Count of arriving transit packets (longword,C) |
| Transit Packets Lost | MNR_NET\$L_TRCNGLOS | Count of packets lost because of transit congestion (longword,C) |
| Receiver Buffer Failures | MNR_NET\$L_RCVBUFFL | Count of receiver buffer failures (longword,C) |

A.4.2.3 DISK Class Record

The DISK class record contains data describing all disk devices in the system. The DISK class record has a record type of 12; its size depends on the number of disks being monitored. The size, in bytes, is calculated by adding the size of the class header, the class prefix, and the data blocks contained in the record. This is shown in the following formula:

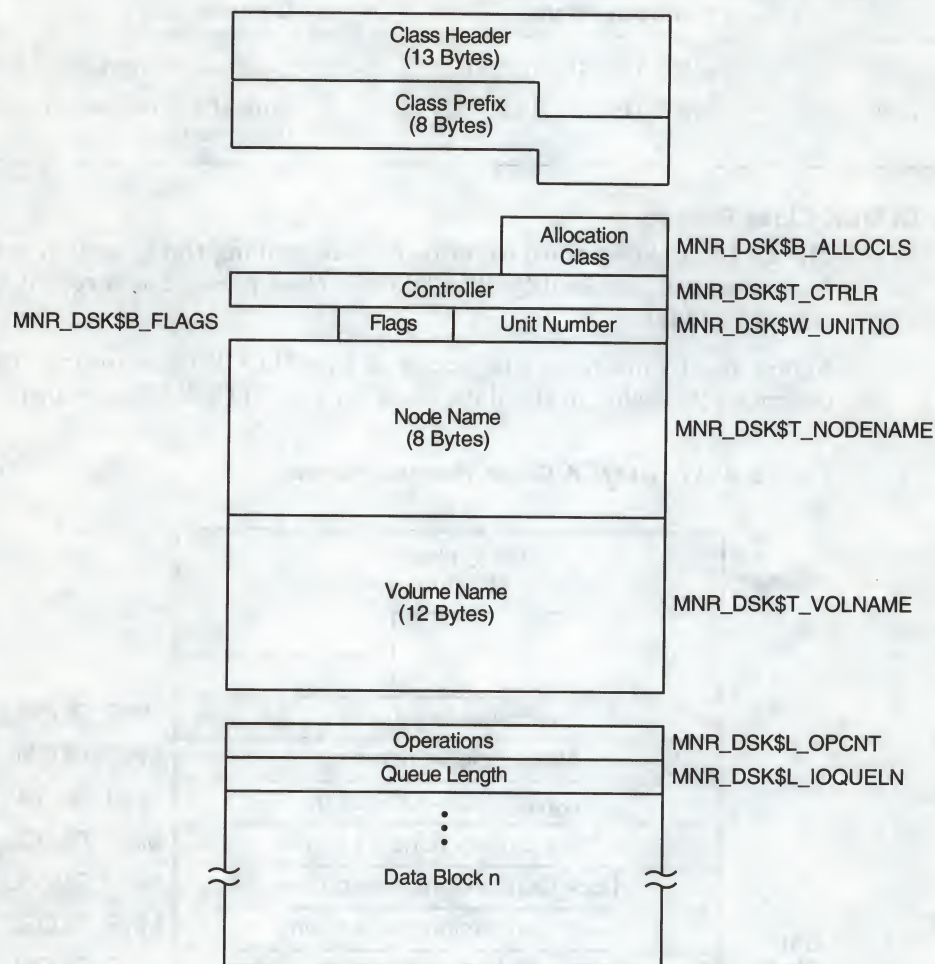
$$13 + 8 + (36 * \text{the value of MNR_CMP$L_ELTCT})$$

Figure A-10 illustrates the format of the DISK class record. Table A-10 describes the fields in the data block for the DISK class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-10 DISK Class Record Format



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Table A-10 Descriptions of DISK Class Record Fields

| Field | Symbolic Offset | Contents |
|------------------|----------------------------------|---|
| Allocation Class | <code>MNR_DSK\$B_ALLOCLS</code> | Allocation class number (byte,I) |
| Controller | <code>MNR_DSK\$T_CTRLR</code> | Name of device controller (counted ASCII string) (4 bytes,I) |
| Unit Number | <code>MNR_DSK\$W_UNITNO</code> | Unit number (word,I) |
| Flags | <code>MNR_DSK\$B_FLAGS</code> | Total of 8 flag bits; if the low bit is set, the device is served by the MSCP server (byte,I) |
| Node Name | <code>MNR_DSK\$T_NODENAME</code> | Name of cluster node where device resides (counted ASCII string) (8 bytes,I) |
| Volume Name | <code>MNR_DSK\$T_VOLNAME</code> | Volume name of disk (ASCII) (12 bytes,I) |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-10 (Cont.) Descriptions of DISK Class Record Fields

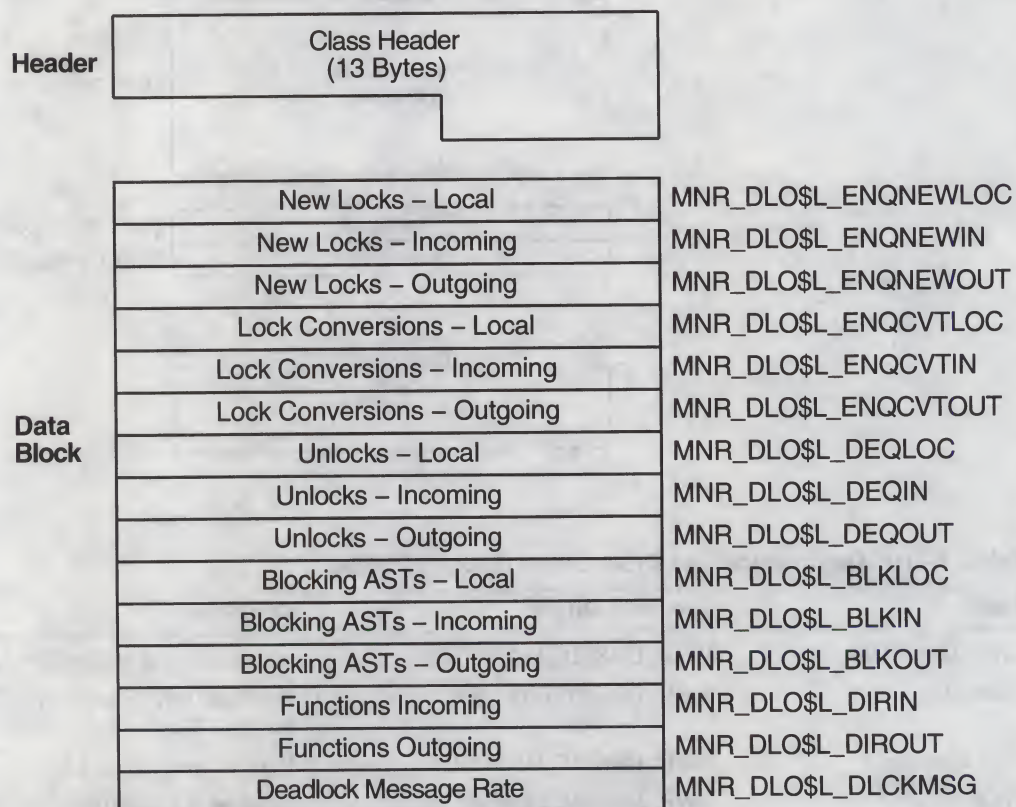
| Field | Symbolic Offset | Contents |
|--------------|--------------------|---|
| Operations | MNR_DSK\$L_OPCNT | Count of I/O operations (longword,C) |
| Queue Length | MNR_DSK\$L_IOQUELN | Sum of I/O request queue samples (longword,C) |

A.4.2.4 DLOCK Class Record

The DLOCK class record contains data describing the operation of the Distributed Lock Management facility. The DLOCK class record has a record type of 14 and a size of 73 bytes.

Figure A-11 illustrates the format of the DLOCK class record. Table A-11 describes the fields in the data block for the DLOCK class record.

Figure A-11 DLOCK Class Record Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-11 Descriptions of DLOCK Class Record Fields

| Field | Symbolic Offset | Contents |
|----------------------------------|----------------------|---|
| New Locks —Local | MNR_DLO\$L_ENQNEWLOC | Count of new lock requests that originate and are performed on this system (local) (longword,C) |
| New Locks —Incoming | MNR_DLO\$L_ENQNEWIN | Count of new lock requests originating on another system and performed on this system (incoming) (longword,C) |
| New Locks —Outgoing | MNR_DLO\$L_ENQNEWOUT | Count of new lock requests originating on this system and performed on another system (outgoing) (longword,C) |
| Lock Conversions —Local | MNR_DLO\$L_ENQCVTLOC | Count of lock conversion requests (local) (longword,C) |
| Lock Conversions —Incoming | MNR_DLO\$L_ENQCVTIN | Count of lock conversion requests (incoming) (longword,C) |
| Lock Conversions —Outgoing | MNR_DLO\$L_ENQCVTOUT | Count of lock conversion requests (outgoing) (longword,C) |
| Unlocks—Local | MNR_DLO\$L_DEQLOC | Count of unlock requests (local) (longword,C) |
| Unlocks—Incoming | MNR_DLO\$L_DEQIN | Count of unlock requests (incoming) (longword,C) |
| Unlocks—Outgoing | MNR_DLO\$L_DEQOUT | Count of unlock requests (outgoing) (longword,C) |
| Blocking ASTs —Local | MNR_DLO\$L_BLKLOC | Count of lock manager blocking ASTs (local) (longword,C) |
| Blocking ASTs —Incoming | MNR_DLO\$L_BLKIN | Count of lock manager blocking ASTs (incoming) (longword,C) |
| Blocking ASTs —Outgoing | MNR_DLO\$L_BLKOUT | Count of lock manager blocking ASTs (outgoing) (longword,C) |
| Directory Functions —Incoming | MNR_DLO\$L_DIRIN | Count of directory functions (incoming) (longword,C) |
| Directory Functions —Outgoing | MNR_DLO\$L_DIROUT | Count of directory functions (outgoing) (longword,C) |
| Deadlock Message Rate | MNR_DLO\$L_DLCKMSG | Count of incoming and outgoing lock manager messages required for deadlock detection (longword,C) |

A.4.2.5 FCP Class Record

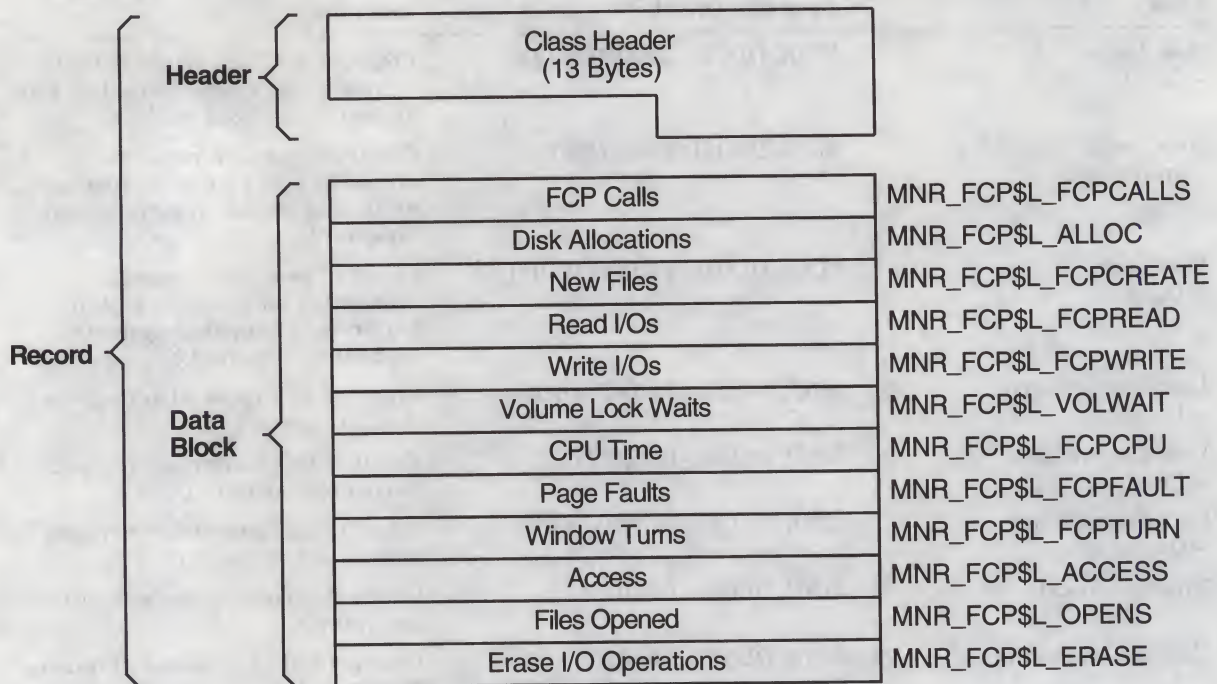
The FCP class record contains data describing the operation of the file system ACPs. The FCP class record has a record type of 5 and a size of 61 bytes.

Figure A-12 illustrates the format of the FCP class record. Table A-12 describes the fields in the data block for the FCP class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-12 FCP Class Record Format



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Table A-12 Descriptions of FCP Class Record Fields

| Field | Symbolic Offset | Contents |
|-------------------|----------------------|--|
| FCP Calls | MNR_FCP\$L_FCPCALLS | Count of QIO requests received by the file system (longword,C) |
| Disk Allocations | MNR_FCP\$L_ALLOC | Count of QIO requests that caused allocation of disk space (longword,C) |
| New Files | MNR_FCP\$L_FCPCREATE | Count of new files created (longword,C) |
| Read I/Os | MNR_FCP\$L_FCPREAD | Count of read I/O operations from the disk by the file system (longword,C) |
| Write I/Os | MNR_FCP\$L_FCPWRITE | Count of write I/O operations to disk by the file system (longword,C) |
| Volume Lock Waits | MNR_FCP\$L_VOLWAIT | Number of times a wait state was entered by the XQP due to volume lock contention (longword,C) |
| CPU Time | MNR_FCP\$L_FCPCPU | Count of clock ticks (10-millisecond units) of CPU time used by the file system (longword,C) |
| FCP Page Faults | MNR_FCP\$L_FCPFAULT | Count of page faults for the file system (longword,C) |
| Window Turns | MNR_FCP\$L_FCPTURN | Count of file-map window misses (longword,C) |
| Access | MNR_FCP\$L_ACCESS | Count of file name lookup operations in file directories (longword,C) |

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A.4 Class Records

Table A-12 (Cont.) Descriptions of FCP Class Record Fields

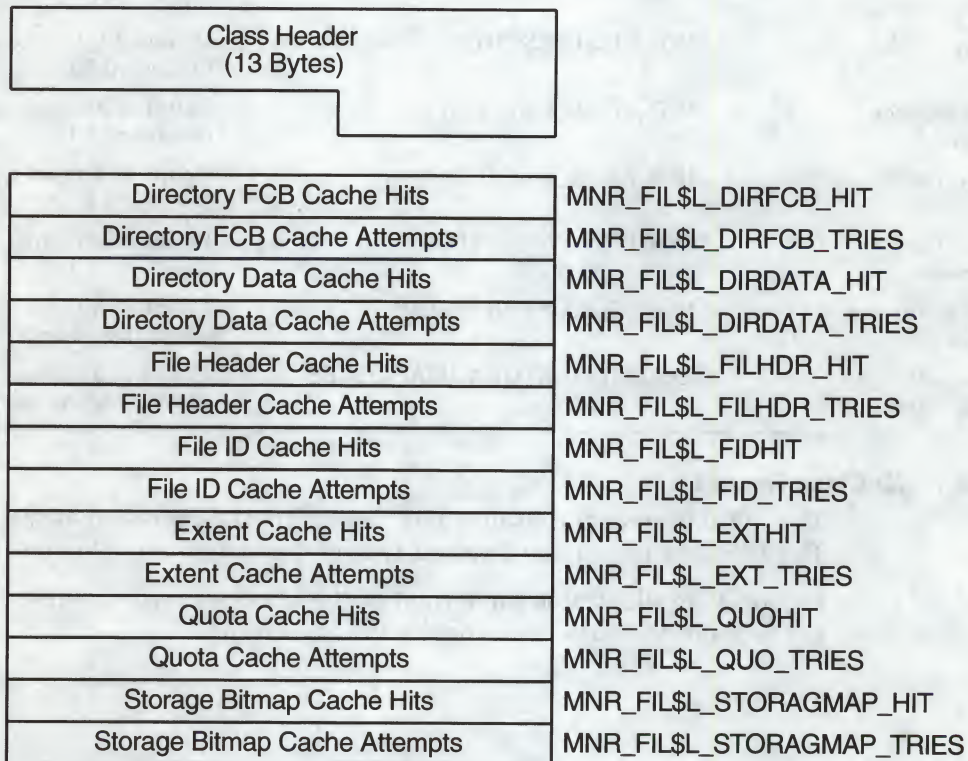
| Field | Symbolic Offset | Contents |
|----------------------|------------------|---|
| Files Opened | MNR_FCP\$L_OPENS | Count of files opened (longword,C) |
| Erase I/O Operations | MNR_FCP\$L_ERASE | Count of erase I/O operations issued (longword,C) |

A.4.2.6 FILE_SYSTEM_CACHE Class Record

The FILE_SYSTEM_CACHE class record contains data describing the operation of the caches for the file system ACPs and XQPs. The FILE_SYSTEM_CACHE class record has a record type of 11 and a size of 69 bytes.

Figure A-13 illustrates the format of the FILE_SYSTEM_CACHE class record. Table A-13 describes the fields in the data block for the FILE_SYSTEM_CACHE class record.

Figure A-13 FILE_SYSTEM_CACHE Class Record Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-13 Descriptions of FILE_SYSTEM_CACHE Class Record Fields

| Field | Symbolic Offset | Contents |
|----------------------------------|----------------------------|---|
| Directory FCB Cache Hits | MNR_FIL\$L_DIRFCB_HIT | Count of hits on directory FCB cache (longword,C) |
| Directory FCB Cache Attempts | MNR_FIL\$L_DIRFCB_TRIES | Count of attempts on directory FCB cache (longword,C) |
| Directory Data Cache Hits | MNR_FIL\$L_DIRDATA_HIT | Count of hits on directory data cache (longword,C) |
| Directory Data Cache Attempts | MNR_FIL\$L_DIRDATA_TRIES | Count of attempts on directory data cache (longword,C) |
| File Header Cache Hits | MNR_FIL\$L_FILHDR_HIT | Count of hits on file header cache (longword,C) |
| File Header Cache Attempts | MNR_FIL\$L_FILHDR_TRIES | Count of attempts on file header cache (longword,C) |
| File ID Cache Hits | MNR_FIL\$L_FIDHIT | Count of hits on file ID cache (longword,C) |
| File ID Cache Attempts | MNR_FIL\$L_FID_TRIES | Count of attempts on file ID cache (longword,C) |
| Extent Cache Hits | MNR_FIL\$L_EXTHIT | Count of hits on extent cache (longword,C) |
| Extent Cache Attempts | MNR_FIL\$L_EXT_TRIES | Count of attempts on extent cache (longword,C) |
| Quota Cache Hits | MNR_FIL\$L_QUOHIT | Count of hits on quota cache (longword,C) |
| Quota Cache Attempts | MNR_FIL\$L_QUO_TRIES | Count of attempts on quota cache (longword,C) |
| Storage Bitmap Cache Hits | MNR_FIL\$L_STORAGMAP_HIT | Count of hits on storage bitmap cache (longword,C) |
| Storage Bitmap Cache Attempts | MNR_FIL\$L_STORAGMAP_TRIES | Count of attempts on storage bitmap cache (longword,C) |

A.4.2.7 I/O Class Record

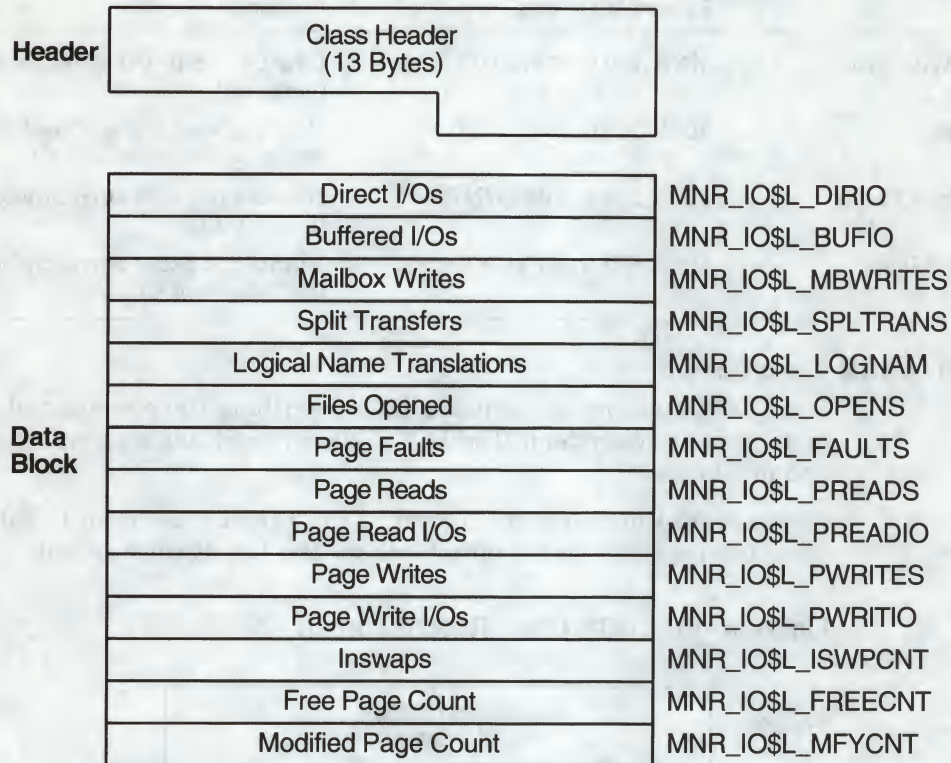
The I/O class record contains data describing the operation of the I/O subsystem. The I/O class record has a record type of 4 and a size of 69 bytes.

Figure A-14 illustrates the format of the I/O class record. Table A-14 describes the fields in the data block for the I/O class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-14 I/O Class Record Format



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Table A-14 Descriptions of I/O Class Record Fields

| Field | Symbolic Offset | Contents |
|---------------------------|--------------------|--|
| Direct I/Os | MNR_IO\$L_DIRIO | Count of direct I/O operations (longword,C) |
| Buffered I/Os | MNR_IO\$L_BUFIO | Count of buffered I/O operations (longword,C) |
| Mailbox Writes | MNR_IO\$L_MBWRITES | Count of write-to-mailbox requests (longword,C) |
| Split Transfers | MNR_IO\$L_SPLTRANS | Count of split transfers (longword,C) |
| Logical Name Translations | MNR_IO\$L_LOGNAM | Count of logical name translations (longword,C) |
| Files Opened | MNR_IO\$L_OPENS | Count of files opened (longword,C) |
| Page Faults | MNR_IO\$L_FAULTS | Count of page faults for all working sets (longword,C) |
| Page Reads | MNR_IO\$L_PREADS | Count of pages read from disk as a result of page faults (longword,C) |
| Page Read I/Os | MNR_IO\$L_PREADIO | Count of read I/O operations from disk as a result of page faults (longword,C) |
| Page Writes | MNR_IO\$L_PWRITES | Count of pages written to the page file (longword,C) |

(continued on next page)

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A.4 Class Records

Table A-14 (Cont.) Descriptions of I/O Class Record Fields

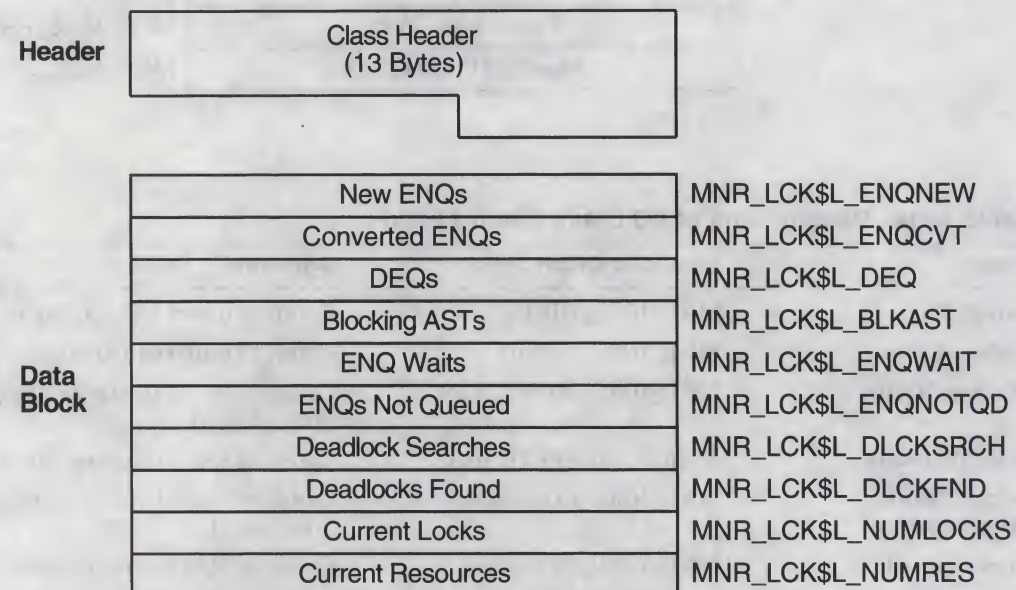
| Field | Symbolic Offset | Contents |
|---------------------|-------------------|--|
| Page Write I/Os | MNR_IO\$L_PWRITIO | Count of write I/O operations to the page file (longword,C) |
| Inswaps | MNR_IO\$L_ISWPCNT | Count of working sets read into memory from the swap file (longword,C) |
| Free Page Count | MNR_IO\$L_FREECNT | Number of pages currently on free-page list (longword,L) |
| Modified Page Count | MNR_IO\$L_MFYCNT | Number of pages currently on modified-page list (longword,L) |

A.4.2.8 LOCK Class Record

The LOCK class record contains data describing the operation of the lock management subsystem. The LOCK class record has a record type of 7 and a size of 53 bytes.

Figure A-15 illustrates the format of the LOCK class record. Table A-15 describes the fields in the data block for the LOCK class record.

Figure A-15 LOCK Class Record Format



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A.4 Class Records

Table A-15 Descriptions of LOCK Class Record Fields

| Field | Symbolic Offset | Contents |
|-------------------|---------------------|--|
| New ENQs | MNR_LCK\$L_ENQNEW | Count of new ENQ (lock) requests (longword,C) |
| Converted ENQs | MNR_LCK\$L_ENQCVT | Count of converted ENQ (lock) requests (longword,C) |
| DEQs | MNR_LCK\$L_DEQ | Count of DEQ (unlock) requests (longword,C) |
| Blocking ASTs | MNR_LCK\$L_BLKAST | Count of blocking ASTs queued (longword,C) |
| ENQ Waits | MNR_LCK\$L_ENQWAIT | Count of times a lock could not be granted immediately and waited (longword,C) |
| ENQs Not Queued | MNR_LCK\$L_ENQNOTQD | Count of times a lock could not be granted immediately and got an error status instead of waiting (longword,C) |
| Deadlock Searches | MNR_LCK\$L_DLCKSRCH | Count of times that a deadlock search was performed (longword,C) |
| Deadlocks Found | MNR_LCK\$L_DLCKFND | Count of times that a deadlock was found (longword,C) |
| Current Locks | MNR_LCK\$L_NUMLOCKS | Number of locks currently in the system (longword,L) |
| Current Resources | MNR_LCK\$L_NUMRES | Number of resources currently in the system (longword,L) |

A.4.2.9 MODES Class Record

The MODES class record contains data describing time spent in each of the processor modes. The MODES class record has a record type of 2; its size depends on the number of active CPUs on the system being monitored. The size, in bytes, is calculated by adding the size of the class header, the class prefix, and the data blocks contained in the record. This is shown in the following formula, which assumes that all CPUs are active:

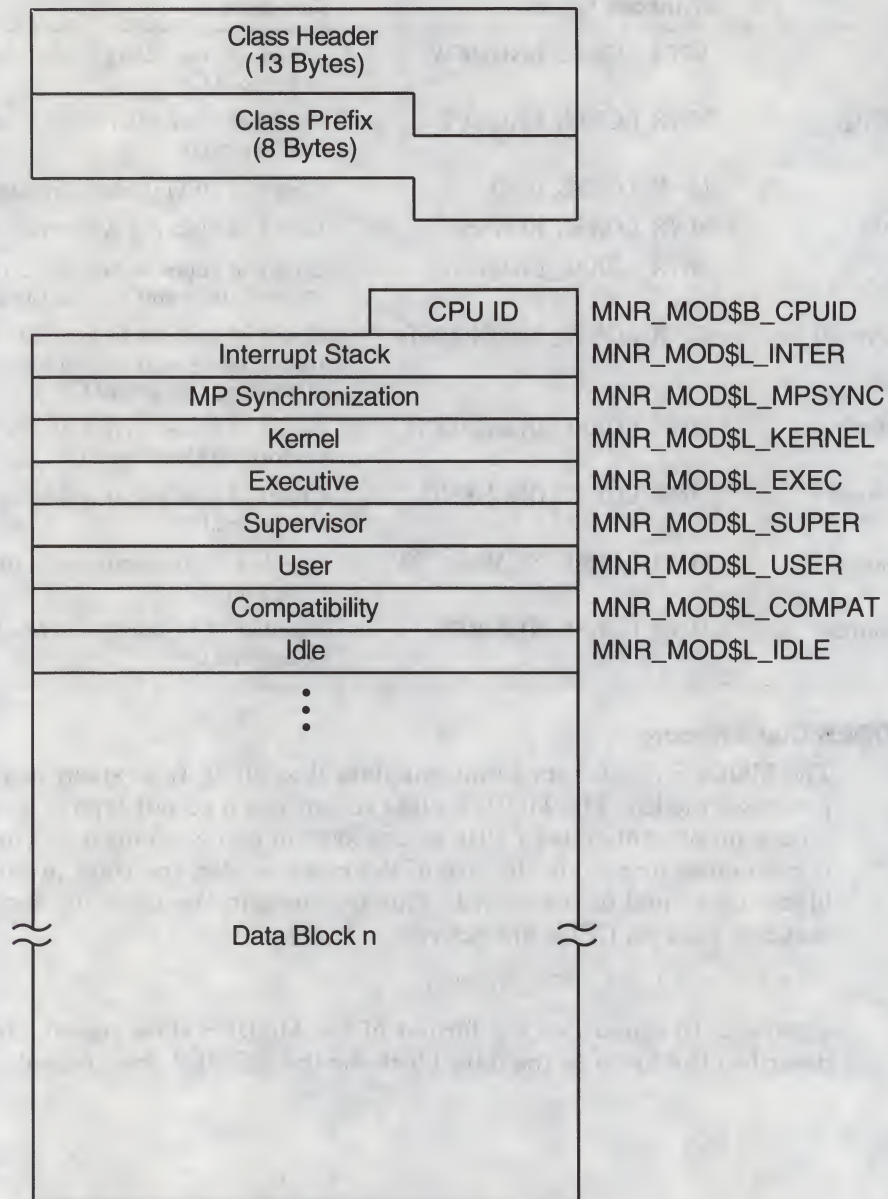
$$13 + 8 + (33 * \text{MNR_SYI\$B_MPCPUS})$$

Figure A-16 illustrates the format of the MODES class record. Table A-16 describes the fields in the data block for the MODES class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-16 MODES Class Record Format



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A.4 Class Records

Table A–16 Descriptions of MODES Class Record Fields

| Field | Symbolic Offset | Contents |
|-----------------|--------------------|---|
| CPU ID | MNR_MOD\$B_CPUID | CPU identification (byte,I) |
| Interrupt Stack | MNR_MOD\$L_INTER | Count of clock ticks (10-millisecond units) spent on interrupt stack since system was booted (longword,C) |
| MP Sync | MNR_MOD\$L_MP_SYNC | Count of clock ticks spent synchronizing multiple CPUs since system boot |
| Kernel | MNR_MOD\$L_KERNEL | Count of clock ticks spent in kernel mode, excluding interrupt stack time, since system boot (longword,C) |
| Executive | MNR_MOD\$L_EXEC | Count of clock ticks spent in executive mode since system boot (longword,C) |
| Supervisor | MNR_MOD\$L_SUPER | Count of clock ticks spent in supervisor mode since system boot (longword,C) |
| User | MNR_MOD\$L_USER | Count of clock ticks spent in user mode, excluding compatibility-mode time since system boot (longword,C) |
| Compatibility | MNR_MOD\$L_COMPAT | Count of clock ticks boot spent in compatibility mode since system boot (longword,C) |
| Idle | MNR_MOD\$L_IDLE | Count of clock ticks spent executing the NULL process since system boot (longword,C) |

A.4.2.10 MSCP_SERVER Class Record

The MSCP_SERVER class record contains data describing activities of the MSCP server. The MSCP_SERVER class record has a record type of 21 and a size of 65 bytes.

Figure A–17 illustrates the format of the MSCP_SERVER class record.

Table A–17 describes the fields in the data block for the MSCP_SERVER class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-17 MSCP_SERVER Class Record Format

| | |
|----------------------------|---------------------|
| Class Header (13 Bytes) | |
| Requests | MNR_MSC\$L_REQUEST |
| Reads | MNR_MSC\$L_READ |
| Writes | MNR_MSC\$L_WRITE |
| Fragments | MNR_MSC\$L_FRAGMENT |
| Splits | MNR_MSC\$L_SPLIT |
| Buffer Waits | MNR_MSC\$L_BUFWAIT |
| 1 Block I/Os | MNR_MSC\$L_SIZE1 |
| 2-3 Block I/Os | MNR_MSC\$L_SIZE2 |
| 4-7 Block I/Os | MNR_MSC\$L_SIZE3 |
| 8-15 Block I/Os | MNR_MSC\$L_SIZE4 |
| 16-31 Block I/Os | MNR_MSC\$L_SIZE5 |
| 32-63 Block I/Os | MNR_MSC\$L_SIZE6 |
| 64+ Block I/Os | MNR_MSC\$L_SIZE7 |

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Table A-17 Descriptions of MSCP_SERVER Class Record Fields

| Field | Symbolic Offset | Contents |
|----------------|---------------------|---|
| Requests | MNR_MSC\$L_REQUEST | Count of requests for I/O transfers by remote processors (longword,C) |
| Reads | MNR_MSC\$L_READ | Count of requests for Read I/O transfers by remote processors (longword,C) |
| Writes | MNR_MSC\$L_WRITE | Count of requests for Write I/O transfers by remote processors (longword,C) |
| Fragments | MNR_MSC\$L_FRAGMENT | Count of extra fragments issued by the server (longword,C) |
| Splits | MNR_MSC\$L_SPLIT | Count of fragmented requests issued by the server (longword,C) |
| Buffer Waits | MNR_MSC\$L_BUFWAIT | Count of requests that had to wait for MSCP buffer memory (longword,C) |
| 1 Block I/Os | MNR_MSC\$L_SIZE1 | Count of I/O requests with a length of one block (longword,C) |
| 2-3 Block I/Os | MNR_MSC\$L_SIZE2 | Count of I/O requests with a length of 2 to 3 blocks (longword,C) |
| 4-7 Block I/Os | MNR_MSC\$L_SIZE3 | Count of I/O requests with a length of 4 to 7 blocks (longword,C) |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-17 (Cont.) Descriptions of MSCP_SERVER Class Record Fields

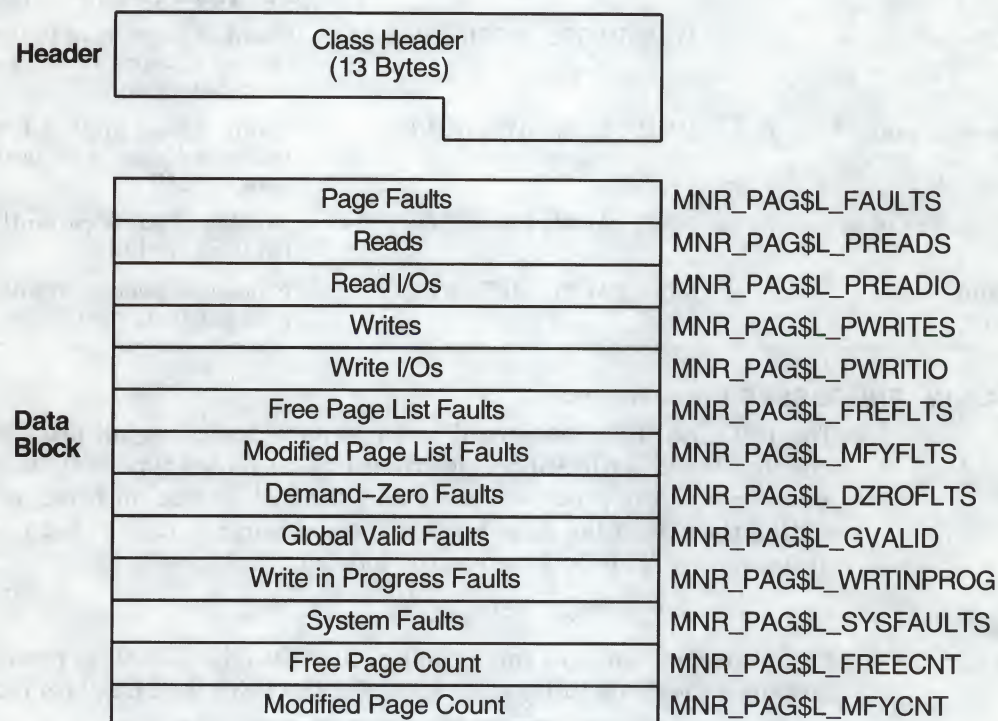
| Field | Symbolic Offset | Contents |
|------------------|------------------|---|
| 8—15 Block I/Os | MNR_MSC\$L_SIZE4 | Count of I/O requests with a length of 8 to 15 blocks (longword,C) |
| 16—31 Block I/Os | MNR_MSC\$L_SIZE5 | Count of I/O requests with a length of 16 to 31 blocks (longword,C) |
| 32—63 Block I/Os | MNR_MSC\$L_SIZE6 | Count of I/O requests with a length of 32 to 63 blocks (longword,C) |
| 64+ Block I/Os | MNR_MSC\$L_SIZE7 | Count of I/O requests with a length equal to or greater than 64 blocks (longword,C) |

A.4.2.11 PAGE Class Record

The PAGE class record contains data describing the operation of the page management subsystem. The PAGE class record has a record type of 3 and a size of 65 bytes.

Figure A-18 illustrates the format of the PAGE class record. Table A-18 describes the fields in the data block for the PAGE class record.

Figure A-18 PAGE Class Record Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-18 Descriptions of PAGE Class Record Fields

| Field | Symbolic Offset | Contents |
|---------------------------|----------------------|---|
| Page Faults | MNR_PAG\$L_FAULTS | Count of page faults for all working set (longword,C) |
| Reads | MNR_PAG\$L_PREADS | Count of pages read from disk as a result of page faults (longword,C) |
| Read I/Os | MNR_PAG\$L_PREADIO | Count of read I/Os as a result of operations from disk page faults (longword,C) |
| Writes | MNR_PAG\$L_PWRITES | Count of pages written to the page file (longword,C) |
| Write I/Os | MNR_PAG\$L_PWRITIO | Count of write I/O operations to the page file (longword,C) |
| Free-page List Faults | MNR_PAG\$L_FREFLT | Count of pages read from the free list as a result of page faults (longword,C) |
| Modified-page List Faults | MNR_PAG\$L_MFYFLT | Count of pages read from the modified list as a result of page faults (longword,C) |
| Demand-zero Faults | MNR_PAG\$L_DZROFLT | Count of zero-filled pages allocated as a result of faults (longword,C) |
| Global Valid Faults | MNR_PAG\$L_GVALID | Count of page faults for which the reference page was found to be valid in the system global page tables (longword,C) |
| Write-in-Progress Faults | MNR_PAG\$L_WRTINPROG | Count of pages read that were in the process of being written back to disk when faulted (longword,C) |
| System Faults | MNR_PAG\$L_SYSFAULTS | Count of page faults for which the referenced page is in system space (longword,C) |
| Free-page Count | MNR_PAG\$L_FREECNT | Number of pages currently on free-page list (longword,L) |
| Modified-page Count | MNR_PAG\$L_MFYCNT | Number of pages currently on modified-page list (longword,L) |

A.4.2.12 PROCESSES Class Record

The PROCESSES class record contains data describing all processes in the system. The PROCESSES class record has a record type of 0; its size depends on the number of processes being monitored. The size, in bytes, is calculated by adding the size of the class header, the class prefix, and the data blocks contained in the record. This is shown in the following formula:

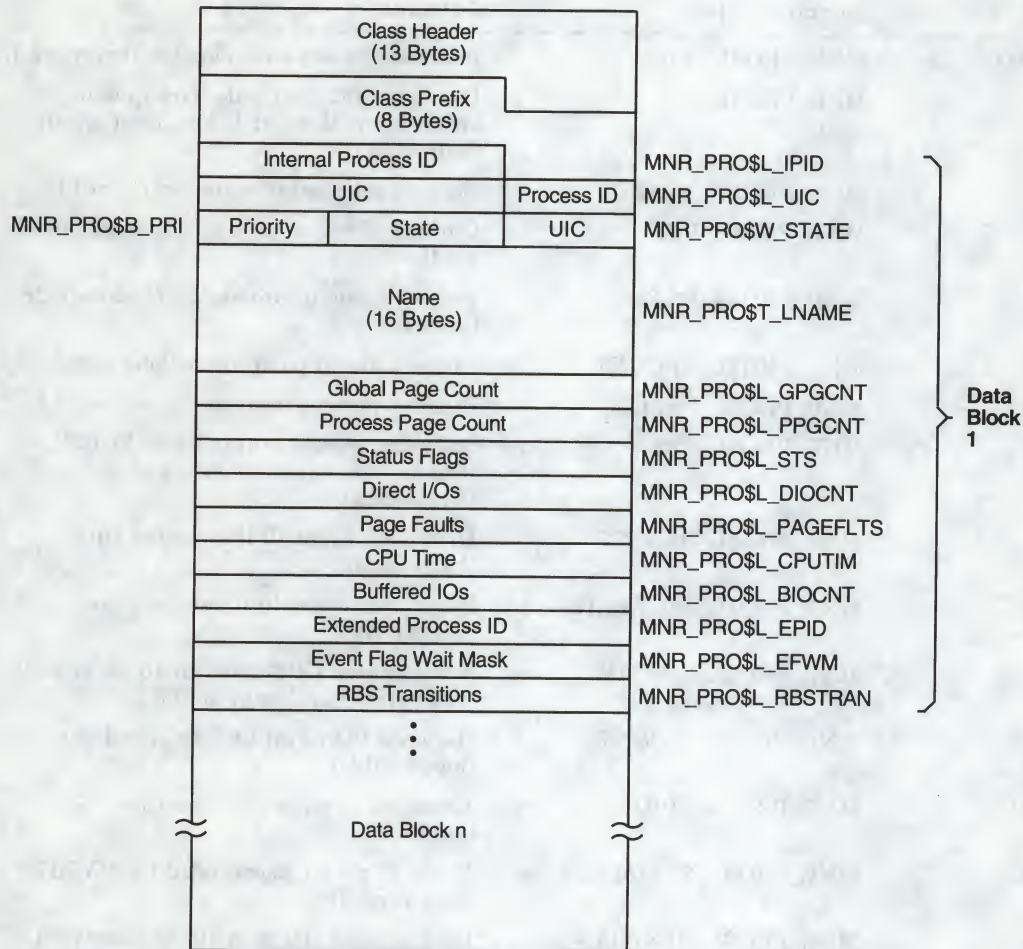
$$13 + 8 + (67 * \text{the value of MNR_CMP$L_ELTCT})$$

Figure A-19 illustrates the format of the PROCESSES class record. Table A-19 describes the fields in the data block for the PROCESSES class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-19 PROCESSES Class Record Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-19 Descriptions of PROCESSES Class Record Fields

| Field | Symbolic Offset | Contents |
|---------------------|---------------------|--|
| Internal Process ID | MNR_PRO\$L_IPID | Internal process identification (longword,I) |
| UIC | MNR_PRO\$L_UIC | User identification code (Group is high-order word; Member is low-order word) (longword,I) |
| State | MNR_PRO\$W_STATE | Current scheduling state code (word,I) |
| Priority | MNR_PRO\$B_PRI | Current software priority (complement of 31) (byte,I) |
| Name | MNR_PRO\$T_LNAME | Process name (counted ASCII string) (16 bytes,I) |
| Global Page Cnt | MNR_PRO\$L_GPGCNT | Current global page count (longword,L) |
| Process Page Cnt | MNR_PRO\$L_PPGCNT | Current process page count (longword,L) |
| Status Flags | MNR_PRO\$L_STS | Software process status flags (PCB\$V_RES bit clear implies swapped out) (longword,I) |
| Direct I/Os | MNR_PRO\$L_DIOCNT | Direct I/O count (0 if swapped out) (longword,C) |
| Page Faults | MNR_PRO\$L_PAGEFLTS | Page fault count (0 if swapped out) (longword,C) |
| CPU Time | MNR_PRO\$L_CPUTIM | Accumulated CPU time, in 10 ms ticks (0 if swapped out) (longword,C) |
| Buffered I/Os | MNR_PRO\$L_BIOCNT | Buffered I/O count (0 if swapped out) (longword,C) |
| Extended Proc ID | MNR_PRO\$L_EPID | Extended process identification (longword,I) |
| Event Flg Wt Mask | MNR_PRO\$L_EFWM | Event flag wait mask (used for MWAITS) (longword, I) |
| RBS Transitions | MNR_PRO\$L_RBSTRAN | Real balance slot transitions (longword, C) |

A.4.2.13 RMS Class Record

The RMS class record contains data describing Record Management Services for specified files. The RMS class record has a record type of 20. Use the following formula to calculate the record size (the formula calculates the size by adding the size of the class header, the class prefix, and the data blocks contained in the record):

$$13 + 8 + (273 * \text{MNR_CMP\$L_ELTCT})$$

Figure A-20 illustrates the format of the RMS class record. Table A-20 describes the fields in the data block for the RMS class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-20 RMS Class Record Format

| | |
|----------------------------|------------------------|
| Class Header (13 Bytes) | |
| Class Prefix (8 Bytes) | |
| | |
| | File Num |
| File Org | MNR_RMS\$B_FILNUM |
| (Reserved) | MNR_RMS\$L_ORG |
| Sequential Gets | MNR_RMS\$L_RESERVED1 |
| Key Gets | MNR_RMS\$L_SEQGETS |
| RFA Gets | MNR_RMS\$L_KEYGETS |
| | MNR_RMS\$L_RFAGETS |
| Get Bytes (8 Bytes) | MNR_RMS\$Q_GETBYTES |
| Sequential Puts | MNR_RMS\$L_SEQPUTS |
| Key Puts | MNR_RMS\$L_KEYPUTS |
| Put Bytes (8 Bytes) | MNR_RMS\$Q_PUTBYTES |
| Updates | MNR_RMS\$L_UPDATES |
| Update Bytes (8 Bytes) | MNR_RMS\$Q_UPDATEBYTES |
| Deletes | MNR_RMS\$L_DELETES |
| Truncates | MNR_RMS\$L_TRUNCATES |
| Truncate Blocks | MNR_RMS\$L_TRUNCBLKS |
| Sequential Finds | MNR_RMS\$L_SEQFINDS |
| Key Finds | MNR_RMS\$L_KEYFINDS |
| RFA Finds | MNR_RMS\$L_RFAFINDS |
| Reads | MNR_RMS\$L_READS |
| Read Bytes (8 Bytes) | MNR_RMS\$Q_READBYTES |
| Connects | MNR_RMS\$L_CONNECTS |
| Disconnects | MNR_RMS\$L_DISCONNECTS |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-20 (Cont.) RMS Class Record Format

| | |
|-----------------------------|-----------------------|
| Extends | MNR_RMS\$L_EXTENDS |
| Extend Blocks | MNR_RMS\$L_EXTBLOCKS |
| Flushes | MNR_RMS\$L_FLUSHES |
| Rewinds | MNR_RMS\$L_REWINDS |
| Writes | MNR_RMS\$L_WRITES |
| Write Bytes (8 Bytes) | MNR_RMS\$Q_WRITEBYTES |
| File Lock ENQs | MNR_RMS\$L_FLCKENQS |
| File Lock DEQs | MNR_RMS\$L_FLCKDEQS |
| File Lock Conversions | MNR_RMS\$L_FLCKCNVS |
| Local Buffer ENQs | MNR_RMS\$L_LBLCKENQS |
| Local Buffer DEQs | MNR_RMS\$L_LBLCKDEQS |
| Local Buffer Conversions | MNR_RMS\$L_LBLCKCNVS |
| Global Buffer ENQs | MNR_RMS\$L_GBLCKENQS |
| Global Buffer DEQs | MNR_RMS\$L_GBLCKDEQS |
| Global Buffer Conversions | MNR_RMS\$L_GBLCKCNVS |
| Global Section ENQs | MNR_RMS\$L_GSLCKENQS |
| Global Section DEQs | MNR_RMS\$L_GSLCKDEQS |
| Global Section Conversions | MNR_RMS\$L_GSLCKCNVS |
| Record Lock ENQs | MNR_RMS\$L_RLCKENQS |
| Record Lock DEQs | MNR_RMS\$L_RLCKDEQS |
| Record Lock Conversions | MNR_RMS\$L_RLCKCNVS |
| Append Lock ENQs | MNR_RMS\$L_APPLCKENQS |
| Append Lock DEQs | MNR_RMS\$L_APPLCKDEQS |
| Append Lock Conversions | MNR_RMS\$L_APPLCKCNVS |
| File Lock Blocking ASTs | MNR_RMS\$L_FLBLKASTS |
| Local Buffer Blocking ASTs | MNR_RMS\$L_LBLBLKASTS |
| Global Buffer Blocking ASTs | MNR_RMS\$L_GBLBLKASTS |
| Append Lock Blocking ASTs | MNR_RMS\$L_APPBLKASTS |
| Local Cache Hits | MNR_RMS\$L_LCACHEHITS |
| Local Cache Attempts | MNR_RMS\$L_LCACHEATT |
| Global Cache Hits | MNR_RMS\$L_GCACHEHITS |
| Global Cache Attempts | MNR_RMS\$L_GCACHEATT |
| Global Buffer Read I/Os | MNR_RMS\$L_GBRDIRIOS |
| Global Buffer Write I/Os | MNR_RMS\$L_GBWDIRIOS |
| Local Buffer Read I/Os | MNR_RMS\$L_LBRDIRIOS |
| Local Buffer Write I/Os | MNR_RMS\$L_LBWDIRIOS |

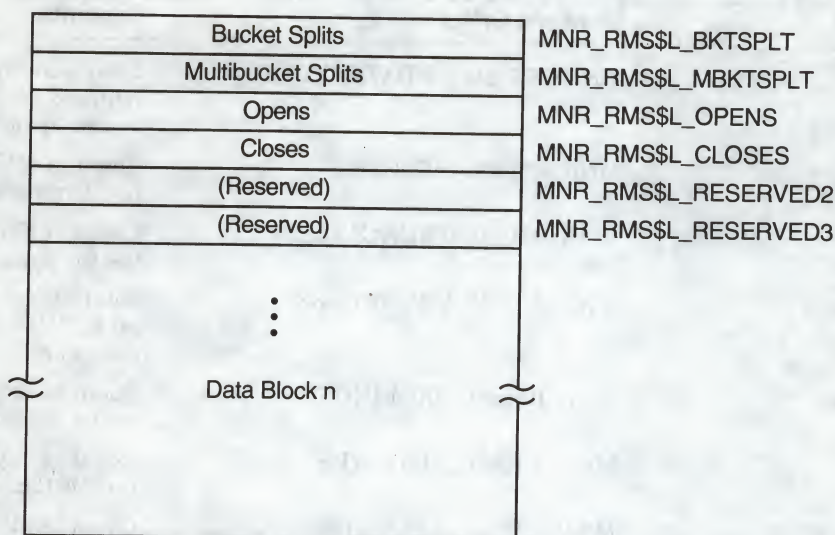
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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-20 (Cont.) RMS Class Record Format



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Table A-20 Descriptions of RMS Class Record Fields

| Field | Symbolic Offset | Contents |
|-----------------|----------------------|---|
| File Number | MNR_RMS\$B_FILNUM | Sequential number of the file (byte,I) |
| Organization | MNR_RMS\$L_ORG | Organization of the file (longword,I) |
| Reserved | MNR_RMS\$L_RESERVED1 | Reserved (longword) |
| Sequential GETs | MNR_RMS\$L_SEQGETS | Count of sequential \$GETs to the file (longword,C) |
| Key GETs | MNR_RMS\$L_KEYGETS | Count of keyed \$GETs to the file (longword,C) |
| RFA GETs | MNR_RMS\$L_RFAGETS | Count of \$GETs by record-file-address to the file (longword,C) |
| GET Bytes | MNR_RMS\$Q_GETBYTES | Total number of bytes required for all \$GETs issued (quadword,C) |
| Sequential PUTs | MNR_RMS\$L_SEQPUTS | Count of sequential \$PUTs to the file (longword,C) |
| Key PUTs | MNR_RMS\$L_KEYPUTS | Count of keyed \$PUTs to the file (longword,C) |
| PUT Bytes | MNR_RMS\$Q_PUTBYTES | Total number of bytes required for all \$PUTs issued (quadword,C) |
| UPDATEs | MNR_RMS\$L_UPDATES | Count of \$UPDATEs to the file (longword,C) |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-20 (Cont.) Descriptions of RMS Class Record Fields

| Field | Symbolic Offset | Contents |
|-----------------------|------------------------|--|
| UPDATE Bytes | MNR_RMS\$Q_UPDATEBYTES | Total number of bytes required for all \$UPDATES issued (quadword,C) |
| DELETES | MNR_RMS\$L_DELETES | Count of \$DELETES to the file (longword,C) |
| TRUNCATES | MNR_RMS\$L_TRUNCATES | Count of \$TRUNCATES to the file (longword,C) |
| TRUNCATE Blocks | MNR_RMS\$L_TRUNCBLKS | Total blocks required for all \$TRUNCATES issued (longword,C) |
| Sequential FINDs | MNR_RMS\$L_SEQFINDS | Count of sequential \$FINDs to the file (longword,C) |
| Key FINDs | MNR_RMS\$L_KEYFINDS | Count of keyed \$FINDs to the file (longword,C) |
| RFA FINDs | MNR_RMS\$L_RFAFINDS | Count of \$FINDs by record-file-address to the file (longword,C) |
| READs | MNR_RMS\$L_READS | Count of \$READs to the file (longword,C) |
| READ Bytes | MNR_RMS\$Q_READBYTES | Total bytes required for all \$READs to the file (quadword,C) |
| CONNECTs | MNR_RMS\$L_CONNECTS | Count of \$CONNECTs to the file (longword,C) |
| DISCONNECTs | MNR_RMS\$L_DISCONNECTS | Count of \$DISCONNECTs to the file (longword,C) |
| EXTENDs | MNR_RMS\$L_EXTENDS | Count of \$EXTENDs to the file (longword,C) |
| EXTEND Blocks | MNR_RMS\$L_EXTBLOCKS | Total blocks required for all EXTENDs to the file (longword,C) |
| FLUSHes | MNR_RMS\$L_FLUSHES | Count of \$FLUSHes to the file (longword,C) |
| REWINDs | MNR_RMS\$L_REWINDS | Count of \$REWINDs to the file (longword,C) |
| WRITES | MNR_RMS\$L_WRITES | Count of \$WRITES to the file (longword,C) |
| WRITE Bytes | MNR_RMS\$Q_WRITEBYTES | Total bytes required for all \$WRITES issued (quadword,C) |
| File Lock ENQs | MNR_RMS\$L_FLCKENQS | Count of file lock ENQs to the file (longword,C) |
| File Lock DEQs | MNR_RMS\$L_FLCKDEQS | Count of file lock DEQs to the file (longword,C) |
| File Lock Conversions | MNR_RMS\$L_FLCKCNVS | Count of file lock conversions for the file (longword,C) |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-20 (Cont.) Descriptions of RMS Class Record Fields

| Field | Symbolic Offset | Contents |
|-----------------------------|-----------------------|--|
| Local Buffer ENQs | MNR_RMS\$L_LBLCKENQS | Count of local buffer ENQs to the file (longword,C) |
| Local Buffer DEQs | MNR_RMS\$L_LBLCKDEQS | Count of local buffer DEQs to the file (longword,C) |
| Local Buffer Conversions | MNR_RMS\$L_LBLCKCNVS | Count of local buffer conversions for the file (longword,C) |
| Global Buffer ENQs | MNR_RMS\$L_GBLCKENQS | Count of global buffer ENQs to the file (longword,C) |
| Global Buffer DEQs | MNR_RMS\$L_GBLCKDEQS | Count of global buffer DEQs to the file (longword,C) |
| Global Buffer Conversions | MNR_RMS\$L_GBLCKCNVS | Count of global buffer conversions for the file (longword,C) |
| Global Section ENQs | MNR_RMS\$L_GSLCKENQS | Count of global section ENQs to the file (longword,C) |
| Global Section DEQs | MNR_RMS\$L_GSLCKDEQS | Count of global section DEQs to the file (longword,C) |
| Global Section Conversions | MNR_RMS\$L_GSLCKCNVS | Count of global section conversions for the file (longword,C) |
| Record Lock ENQs | MNR_RMS\$L_RLCKENQS | Count of record lock ENQs to the file (longword,C) |
| Record Lock DEQs | MNR_RMS\$L_RLCKDEQS | Count of record lock DEQs to the file (longword,C) |
| Record Lock Conversions | MNR_RMS\$L_RLCKCNVS | Count of record lock conversions for the file (longword,C) |
| Append Lock ENQs | MNR_RMS\$L_APPLCKENQS | Count of append lock ENQs to the file (longword,C) |
| Append Lock DEQs | MNR_RMS\$L_APPLCKDEQS | Count of append lock DEQs to the file (longword,C) |
| Append Lock Conversions | MNR_RMS\$L_APPLCKCNVS | Count of append lock conversions for the file (longword,C) |
| File Lock Blocking ASTs | MNR_RMS\$L_FLBLKASTS | Count of file lock blocking ASTs for the file (longword,C) |
| Local Buffer Blocking ASTs | MNR_RMS\$L_LBLBLKASTS | Count of local buffer blocking ASTs for the file (longword,C) |
| Global Buffer Blocking ASTs | MNR_RMS\$L_GBLBLKASTS | Count of global buffer blocking ASTs for the file (longword,C) |
| Append Lock Blocking ASTs | MNR_RMS\$L_APPBLKASTS | Count of append lock blocking ASTs for the file (longword,C) |
| Local Cache Hits | MNR_RMS\$L_LCACHEHITS | Count of local cache hits for the file (longword,C) |

(continued on next page)

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-20 (Cont.) Descriptions of RMS Class Record Fields

| Field | Symbolic Offset | Contents |
|--------------------------|-----------------------|---|
| Local Cache Attempts | MNR_RMS\$L_LCACHEATT | Count of local cache attempts for the file (longword,C) |
| Global Cache Hits | MNR_RMS\$L_GCACHEHITS | Count of global cache hits for the file (longword,C) |
| Global Cache Attempts | MNR_RMS\$L_GCACHEATT | Count of global cache attempts for the file (longword,C) |
| Global Buffer Read I/Os | MNR_RMS\$L_GBRDIROS | Count of global buffer read I/Os for the file (longword,C) |
| Global Buffer Write I/Os | MNR_RMS\$L_GBWDIROS | Count of global buffer write I/Os for the file (longword,C) |
| Local Buffer Read I/Os | MNR_RMS\$L_LBRDIROS | Count of local buffer read I/Os for the file (longword,C) |
| Local Buffer Write I/Os | MNR_RMS\$L_LBWDIROS | Count of local buffer write I/Os for the file (longword,C) |
| Bucket Splits | MNR_RMS\$L_BKTSPLT | Count of bucket splits for the file (longword,C) |
| Multibucket Splits | MNR_RMS\$L_MBKTSPLT | Count of multibucket splits for the file (longword,C) |
| Opens | MNR_RMS\$L_OPENS | Count of the times the file was opened (longword,C) |
| Closes | MNR_RMS\$L_CLOSES | Count of the times the file was closed (longword,C) |
| Reserved | MNR_RMS\$L_RESERVED2 | Reserved (longword) |
| Reserved | MNR_RMS\$L_RESERVED3 | Reserved (longword) |

A.4.2.14 SCS Class Record

The SCS class record contains data describing SCS (System Communications Services) activity for all SCS connections in the system, on a per-node basis. The SCS class record has a record type of 15; its size depends on the number of nodes being monitored. The size, in bytes, is calculated by adding the size of the class header, the class prefix, and the data blocks contained in the record. This is shown in the following formula:

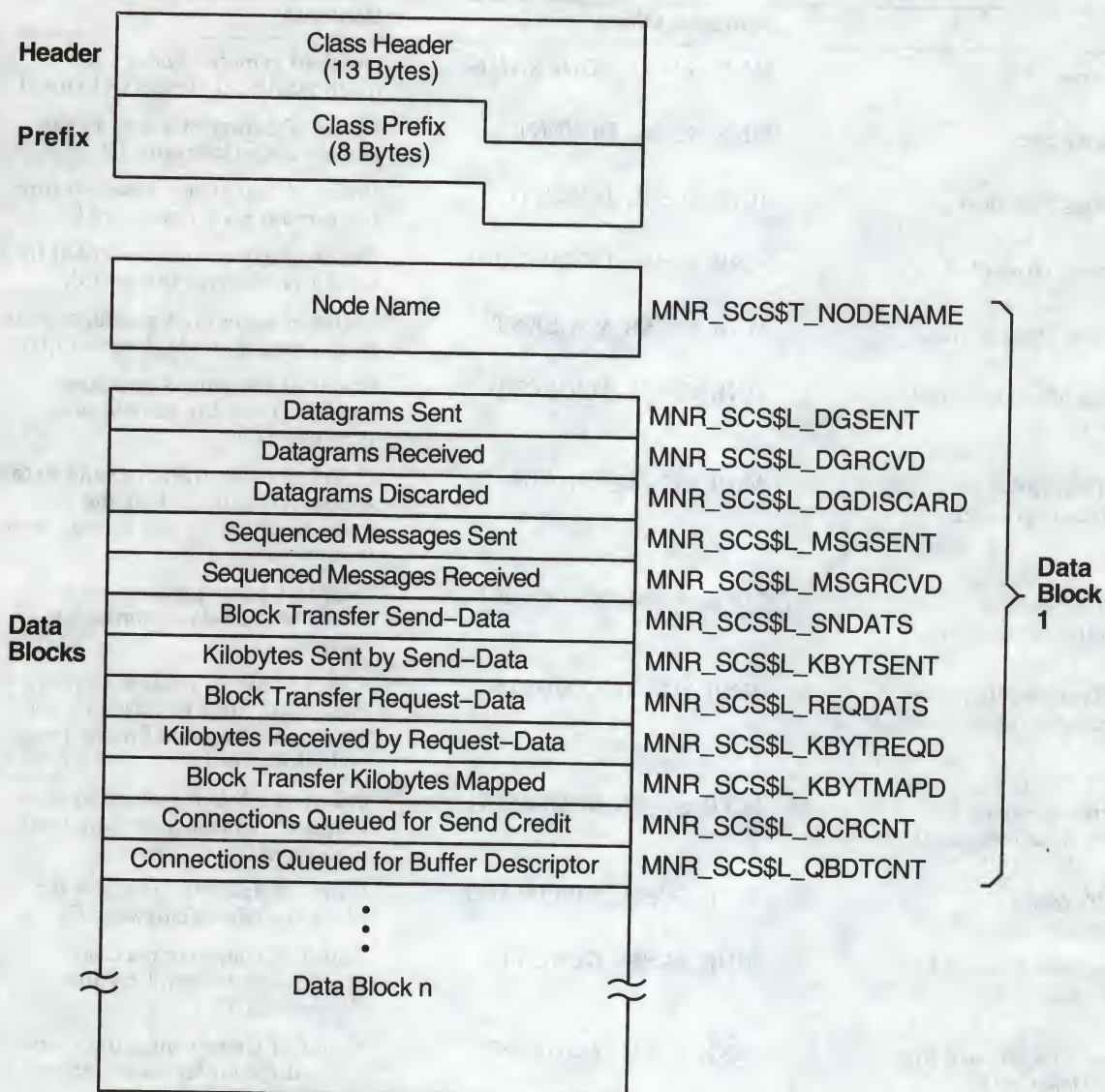
$$13 + 8 + (56 * \text{the value of MNR_CMP$L_ELTCT})$$

Figure A-21 illustrates the format of the SCS class record. Table A-21 describes the fields in the data block for the SCS class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-21 SCS Class Record Format



SCS Class Record Format

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A.4 Class Records

Table A-21 Descriptions of SCS Class Record Fields

| Field | Symbolic Offset | Contents |
|--|----------------------|--|
| Node Name | MNR_SCS\$T_NODENAME | Name of remote cluster node (counted ASCII string) (8 bytes,I) |
| Datagrams Sent | MNR_SCS\$L_DGSENT | Count of datagrams sent to the remote node (longword,C) |
| Datagrams Received | MNR_SCS\$L_DGRCVD | Count of datagrams received from the remote node (longword,C) |
| Datagrams Discarded | MNR_SCS\$L_DGDISCARD | Count of datagrams discarded by the CI port driver (longword,C) |
| Sequenced Msgs Sent | MNR_SCS\$L_MSGSENT | Count of sequenced messages sent to the remote node (longword,C) |
| Sequenced Msgs Received | MNR_SCS\$L_MSGRCVD | Count of sequenced messages received from the remote node (longword,C) |
| Block Transfer Send-data commands | MNR_SCS\$L_SNDATS | Count of block transfer send-data commands initiated on the local node, targeted for the remote node (longword,C) |
| Kilobytes Sent by Send-data commands | MNR_SCS\$L_KBYTSENT | Count of kilobytes sent as a result of send-data commands (longword,C) |
| Block Transfer Request- data commands | MNR_SCS\$L_REQDATS | Count of block transfer request-data commands initiated on the local node, targeted for the remote node (longword,C) |
| Kilobytes Received by Request-data commands | MNR_SCS\$L_KBYTREQD | Count of kilobytes received as a result of request-data commands (longword,C) |
| Block Transfer Kilobytes Mapped | MNR_SCS\$L_KBYTMAPD | Count of kilobytes mapped for block transfers (longword,C) |
| Connections Queued For Send Credit | MNR_SCS\$L_QCRCNT | Count of times connections are queued for send credits (longword,C) |
| Connections Queued For Buffer Descriptor | MNR_SCS\$L_QBDTCNT | Count of times connections are queued for buffer descriptors (longword,C) |

A.4.2.15 STATES Class Record

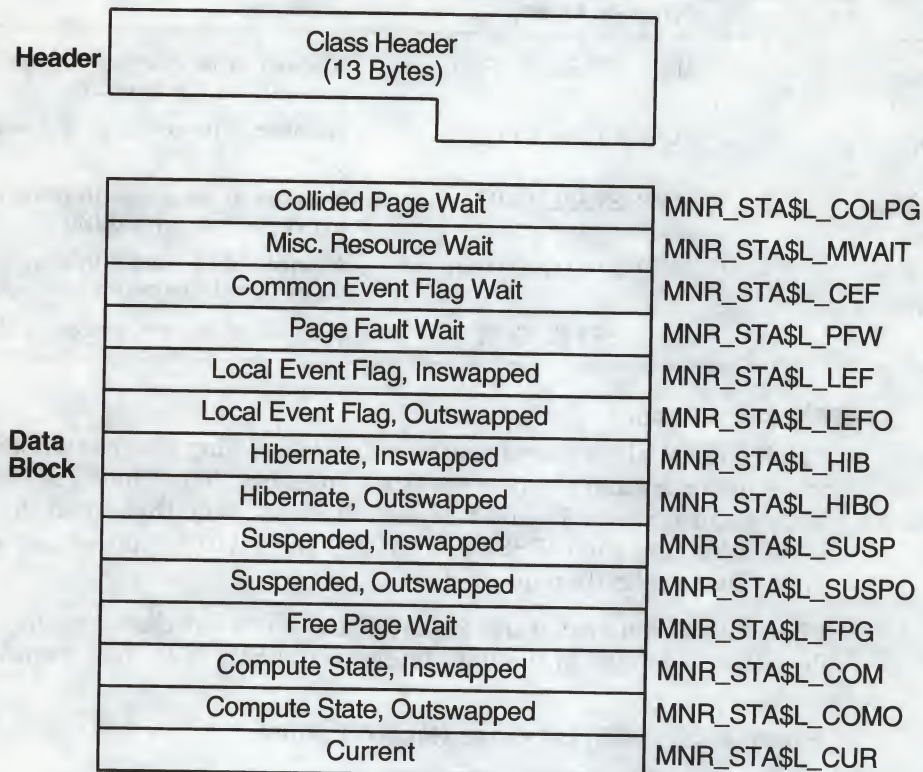
The STATES class record contains data describing the number of processes in each of the scheduler states. The STATES class record has a record type of 1 and a size of 69 bytes.

Figure A-22 illustrates the format of the STATES class record. Table A-22 describes the fields in the data block for the STATES class record.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-22 STATES Class Record Format



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Table A-22 Descriptions of STATES Class Record Fields

| Field | Symbolic Offset | Contents |
|----------------------------|------------------|---|
| Collided Page Wait | MNR_STA\$L_COLPG | Number of processes in collided page wait (longword,L) |
| Misc Resource Wait | MNR_STA\$L_MWAIT | Number of processes in miscellaneous resource wait (longword,L) |
| Common Event Flag Wait | MNR_STA\$L_CEF | Number of processes in common event flag wait (longword,L) |
| Page Fault Wait | MNR_STA\$L_PFW | Number of processes in page fault wait (longword,L) |
| Loc Event Flag, Inswapped | MNR_STA\$L_LEF | Number of processes in local event flag wait, inswapped (longword,L) |
| Loc Event Flag, Outswapped | MNR_STA\$L_LEFO | Number of processes in local event flag wait, outswapped (longword,L) |
| Hibernate, Inswapped | MNR_STA\$L_HIB | Number of processes in hibernate wait, inswapped (longword,L) |
| Hibernate, Outswapped | MNR_STA\$L_HIBO | Number of processes in hibernate wait, outswapped (longword,L) |
| Suspended, Inswapped | MNR_STA\$L_SUSP | Number of processes in suspended wait, inswapped (longword,L) |

(continued on next page)

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-22 (Cont.) Descriptions of STATES Class Record Fields

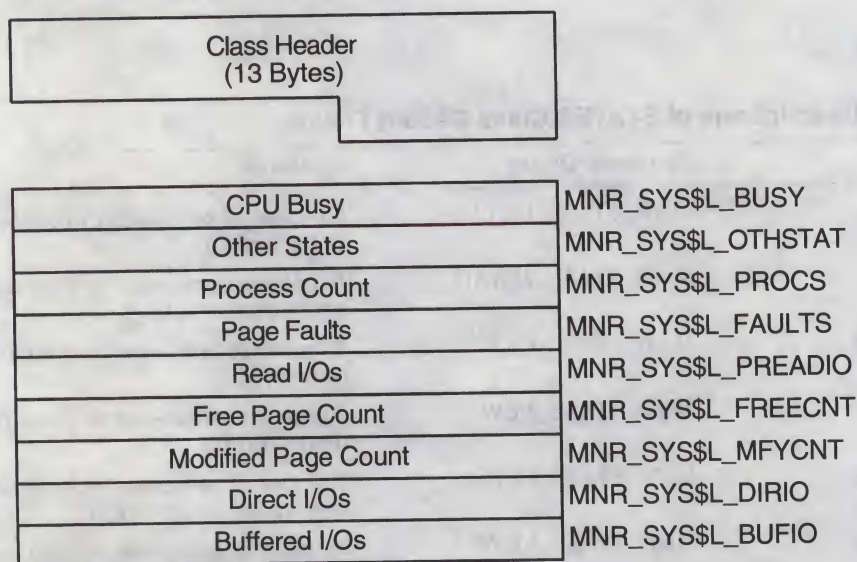
| Field | Symbolic Offset | Contents |
|---------------------------|------------------|--|
| Suspended, Outswapped | MNR_STA\$L_SUSPO | Number of processes in suspended wait, outswapped (longword,L) |
| Free Page Wait | MNR_STA\$L_FPG | Number of processes in free wait (longword,L) |
| Compute State, Inswapped | MNR_STA\$L_COM | Number of processes in compute state, inswapped (longword,L) |
| Compute State, Outswapped | MNR_STA\$L_COMO | Number of processes in compute state, outswapped (longword,L) |
| Current | MNR_STA\$L_CUR | Number of current processes (longword,L) |

A.4.2.16 SYSTEM Class Record

The SYSTEM class record contains data describing the overall operation of the three major system components (CPU, memory, I/O). The SYSTEM class record has a record type of 17 and a size of 49 bytes. Note that when the SYSTEM class is recorded, the PROCESSES, STATES, and MODES classes are also recorded, even if not explicitly requested.

Figure A-23 illustrates the format of the SYSTEM class record. Table A-23 describes the fields in the data block for the SYSTEM class record.

Figure A-23 SYSTEM Class Record Format



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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-23 Descriptions of SYSTEM Class Record Fields

| Field | Symbolic Offset | Contents |
|---------------------|--------------------|---|
| CPU Busy | MNR_SYS\$L_BUSY | Count of clock ticks (10-millisecond units) spent in all CPU modes since system was booted (longword,C) |
| Other States | MNR_SYS\$L_OTHSTAT | Number of processes in states other than LEF, LEFO, HIB, HIBO, COM, COMO, PFW, and MWAIT (longword,L) |
| Process Count | MNR_SYS\$L_PROCS | Number of processes in system (longword,L) |
| Page Faults | MNR_SYS\$L_FAULTS | Count of page faults for all working sets (longword,C) |
| Read I/Os | MNR_SYS\$L_PREADIO | Count of read I/Os resulting from disk page faults (longword,C) |
| Free Page Count | MNR_SYS\$L_FREECNT | Number of pages currently on free-page list (longword,L) |
| Modified Page Count | MNR_SYS\$L_MFYCNT | Number of pages currently on modified-page list (longword,L) |
| Direct I/Os | MNR_SYS\$L_DIRIO | Count of direct I/O operations (longword,C) |
| Buffered I/Os | MNR_SYS\$L_BUFIO | Count of buffered I/O operations (longword,C) |

A.4.2.17 TRANSACTION Class Record

The TRANSACTION class record contains data describing the operations of the DECdtm transaction manager. The TRANSACTION class has a record type of 22 and a size of 69 bytes. Figure A-24 illustrates the format of the TRANSACTION class record. Table A-24 describes the contents of each of its fields.

Supplemental MONITOR Information—Record Formats

A.4 Class Records

Figure A-24 TRANSACTION Class Record Format

| | |
|----------------------------|----------------------|
| Class Header (13 Bytes) | |
| Starts | MNR_TRA\$ _STARTS |
| Prepares | MNR_TRA\$ _PREPARES |
| One Phase Commits | MNR_TRA\$ _ONE_PHASE |
| Commits | MNR_TRA\$ _COMMITTS |
| Aborts | MNR_TRA\$ _ABORTS |
| Ends | MNR_TRA\$ _ENDS |
| Branches | MNR_TRA\$ _BRANCHS |
| Adds | MNR_TRA\$ _ADDS |
| 0-1 Transactions | MNR_TRA\$ _BUCKETS1 |
| 1-2 Transactions | MNR_TRA\$ _BUCKETS2 |
| 2-3 Transactions | MNR_TRA\$ _BUCKETS3 |
| 3-4 Transactions | MNR_TRA\$ _BUCKETS4 |
| 4-5 Transactions | MNR_TRA\$ _BUCKETS5 |
| 5+ Transactions | MNR_TRA\$ _BUCKETS6 |

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Supplemental MONITOR Information—Record Formats

A.4 Class Records

Table A-24 Descriptions of TRANSACTION Class Record Fields

| Field | Symbolic Offset | Contents |
|-------------------|----------------------|---|
| Starts | MNR_TRA\$L_STARTS | Count of transactions started. The number of times that calls on the local node to \$START_TRANS have completed successfully (longword, C). |
| Prepares | MNR_TRA\$L_PREPARES | Count of transactions that have been prepared (longword, C). |
| One Phase Commits | MNR_TRA\$L_ONE_PHASE | Count of one-phase commit events initiated (longword, C). |
| Commits | MNR_TRA\$L_COMMITS | Count of transactions committed. This is the combined total of one-phase and two-phase commits (longword, C). |
| Aborts | MNR_TRA\$L_ABORTS | Count of transactions aborted. Combined total of planned and unplanned aborts (longword, C). |
| Ends | MNR_TRA\$L_ENDS | Count of transactions ended. The number of times that calls on the local node to \$END_TRANS have completed successfully (longword, C). |
| Branches | MNR_TRA\$L_BRANCHS | Count of transaction branches started on the local node (longword, C). |
| Adds | MNR_TRA\$L_ADDS | Count of transaction branches added on the local node (longword, C). |
| 0-1 Transactions | MNR_TRA\$L_BUCKETS1 | Count of transactions with a duration of less than 1 second (longword, C). |
| 1-2 Transactions | MNR_TRA\$L_BUCKETS2 | Count of transactions with a duration of 1 to 2 (1.99) seconds (longword, C). |
| 2-3 Transactions | MNR_TRA\$L_BUCKETS3 | Count of transactions with a duration of 2 to 3 seconds (longword, C). |
| 3-4 Transactions | MNR_TRA\$L_BUCKETS4 | Count of transactions with a duration of 3 to 4 seconds (longword, C). |
| 4-5 Transactions | MNR_TRA\$L_BUCKETS5 | Count of transactions with a duration of 4 to 5 seconds (longword, C). |
| 5+ Transactions | MNR_TRA\$L_BUCKETS6 | Count of transactions with a duration greater than 5 seconds (longword, C). |

Supplemental MONITOR Information—Record Formats

A.4 Class Records

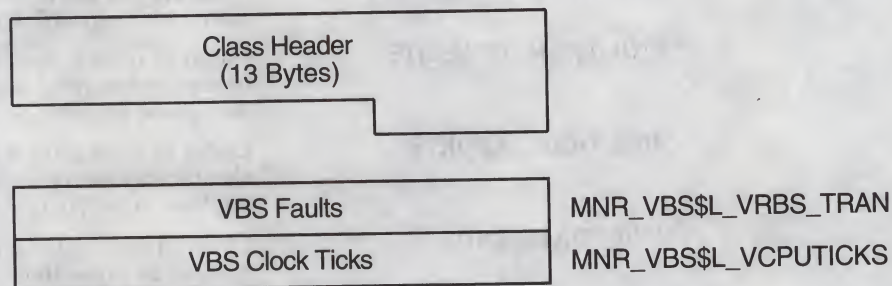
A.4.2.18 VBS Class Record (VAX Only)

VAX

On VAX systems, the VBS class record contains statistics on the operation of the virtual balance slot (VBS) mechanism. The VBS class record has a record type of 24 and a size of 21 bytes.

Figure A-25 illustrates the format of a VBS class record. Table A-25 describes the fields in the data block for the VBS class record.

Figure A-25 VBS Class Record Format (VAX Only)



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Table A-25 Descriptions of VBS Class Record Fields (VAX Only)

| Field | Symbolic Offset | Contents |
|-----------------|----------------------|---|
| VBS Faults | MNR_VBS\$L_VRBS_TRAN | Count of faults from virtual balance slots to real balance slots (longword, C) |
| VBS Clock Ticks | MNR_VBS\$L_VCPUTICKS | Count of virtual balance slot clock ticks (10-millisecond units) (longword, C)♦ |

Supplemental MONITOR Information—Record Formats

A.4 Class Records

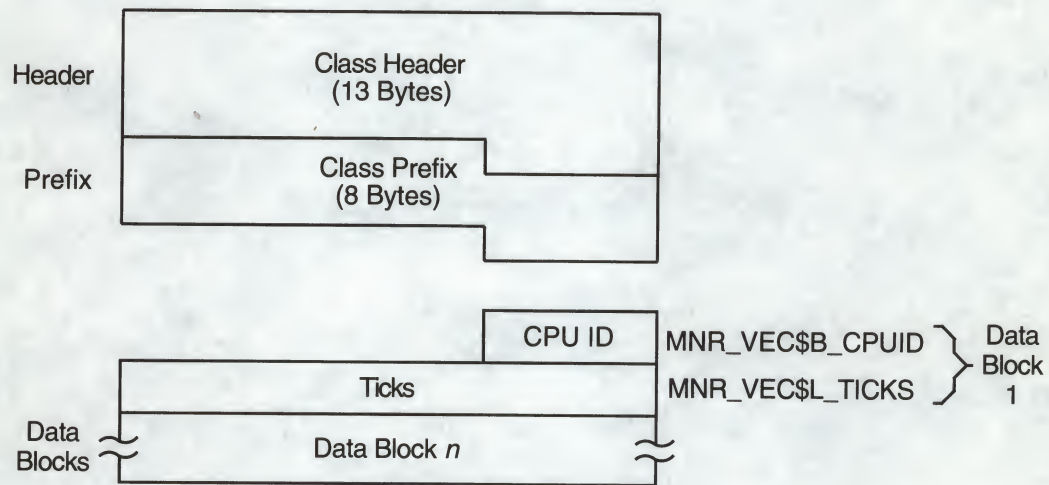
A.4.2.19 VECTOR Class Record

The VECTOR class record contains data describing the time during which vector consumers have been scheduled on a vector-present processor. Its record type number is 23. A VECTOR class record is of variable length and depends on the number of active processors in the system. Assuming all processors are active, MONITOR calculates the size of the record by adding the size of the class header, the class prefix, and the data blocks contained in the record. This is shown in the following formula:

$$13 + 8 + (5 * \text{MNR_SYI\$B_VPCPUS})$$

Figure A-26 illustrates the format of the VECTOR class record. Table A-26 describes the contents of each of its fields.

Figure A-26 VECTOR Class Record Format



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Table A-26 Descriptions of VECTOR Class Record Fields

| Field | Symbolic Offset | Contents |
|--------|------------------|--|
| CPU ID | MNR_VEC\$B_CPUID | Identification of the processor from which the data has been collected (byte, I) |
| Ticks | MNR_VEC\$L_TICKS | Number of 10-millisecond clock ticks in which a vector consumer has been scheduled on this processor (longword, C) |

To support the VECTOR class, MONITOR uses the items MNR_SYI\$B_VPCPUS and MNR_SYI\$L_VPCONF in the system information record. See Table A-3 for details on these items.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

The Journal of the American Medical Association is a weekly publication of the American Medical Association, 535 North Dearborn Street, Chicago, Ill. 60610. It is published for the Association by the American Medical Association Publishing Company, 535 North Dearborn Street, Chicago, Ill. 60610. The Journal is a national publication and is distributed to all members of the American Medical Association. It is also available to non-members for purchase. The Journal is a valuable source of information for the medical profession and the public. It contains articles on a wide variety of subjects, including clinical medicine, surgery, pediatrics, obstetrics and gynecology, and public health. It also contains news items, book reviews, and other material of interest to the medical profession. The Journal is published in English and is available in other languages. It is a member of the International Association of Medical Journals. The Journal is a valuable source of information for the medical profession and the public. It contains articles on a wide variety of subjects, including clinical medicine, surgery, pediatrics, obstetrics and gynecology, and public health. It also contains news items, book reviews, and other material of interest to the medical profession. The Journal is published in English and is available in other languages. It is a member of the International Association of Medical Journals.

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FIGURE 1. A schematic diagram of the experimental setup.



FIGURE 2. A schematic diagram of the experimental setup.

| TABLE 1. Summary of the experimental results. | |
|---|-------------------|
| Experiment | Results |
| 1. Patient (100 lbs) | Support (100 lbs) |
| 2. Support (100 lbs) | Base (100 lbs) |
| 3. Base (100 lbs) | Support (100 lbs) |
| 4. Support (100 lbs) | Base (100 lbs) |
| 5. Base (100 lbs) | Support (100 lbs) |
| 6. Support (100 lbs) | Base (100 lbs) |
| 7. Base (100 lbs) | Support (100 lbs) |
| 8. Support (100 lbs) | Base (100 lbs) |
| 9. Base (100 lbs) | Support (100 lbs) |
| 10. Support (100 lbs) | Base (100 lbs) |

The results of the experiments are summarized in Table 1. The table shows the relationship between the patient, support, and base in various configurations. The results indicate that the support and base are essential for the patient's stability. The patient's weight is supported by the support and base, and the support and base are supported by the patient. The results also show that the support and base are essential for the patient's movement. The patient can move only when the support and base are present. The results are consistent with the theoretical model of the experimental setup.

SHOW CLUSTER Keypad Commands

SHOW CLUSTER provides a predefined keypad that you can use to enter selected commands. You can add, remove, or reposition windows, scroll their contents, or change the interval at which the display is updated. You can also customize the keypad by redefining the default functions of individual keys.

B.1 Using the Keypad

By default, the numeric keypad is defined as shown in Figure B-1.

Figure B-1 SHOW CLUSTER Default Keypad

| | | | |
|---------------------------------|----------------------------------|--|---------------------------------|
| PF1 GOLD 20 | PF2 HELP 10 | PF3 REFRESH 11 | PF4 INIT 17 |
| 7 SET FUNCTION PAN 7 | 8 SET FUNCTION SCROLL 8 | 9 SET FUNCTION MOVE 9 | — SET FUNCTION EDIT 18 |
| 4 ADD 4 | 5 REMOVE 5 | 6 SET AUTO_POS OFF SET AUTO_POS ON 6 | , 19 |
| 1 SET 1 | 2 SAVE 2 | 3 WRITE 3 | |
| 0 0 | | . SELECT DESELECT 16 | |
| | | | 21 |

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Shading over a keypad command indicates that you must press the GOLD key and then the keypad key.

SHOW CLUSTER Keypad Commands

B.1 Using the Keypad

Table B-1 describes each of the keypad commands you can use with the Show Cluster utility. In this table, KP n refers to the keypad key labeled with the number n . For example, KP2 refers to the keypad key labeled with the number 2. All commands shown on the keypad are also discussed in the Command Section of Chapter 4.

Table B-1 SHOW CLUSTER Keypad Commands

| Command | Key or Key Sequence | Description |
|-------------------|---------------------|--|
| ADD | KP4 | Modifies the current display by including the field or class that you specify after the ADD command. |
| DESELECT | GOLD-Period | Terminates a window selection. |
| GOLD | PF1 | When pressed before another keypad key, specifies the second key's alternate function (the bottom function on the keypad diagram). |
| HELP | PF2 | Displays information about using the editing keypad. |
| INIT | PF4 | Resets the display using the original default values for field names, class names, and field widths. |
| REFRESH | PF3 | Refreshes the screen display. Clears and redraws the screen, deleting any extraneous characters or messages that might have appeared on the screen but are not part of the SHOW CLUSTER display. (Performs the same function as Ctrl/W.) |
| REMOVE | KP5 | Modifies the current display by removing the field or class that you specify after the REMOVE command. |
| SAVE | KP2 | Allows you to save the current display to a startup initialization file or a command procedure that you can then use to restore the display at a later time. |
| SELECT | Period | Designates which window to scroll or move. |
| SET | KP1 | Changes any of several options including the number of columns in the display, the number of seconds between updates, the functions of the arrow keys, the auto positioning of windows, and the characteristics of a particular field. |
| SET AUTO_POS OFF | KP6 | Disables the automatic positioning of windows on the screen. |
| SET AUTO_POS ON | GOLD-KP6 | Enables the Show Cluster utility to automatically position windows on the screen. This is the default setting. |
| SET FUNCTION EDIT | Hyphen | Redefines the arrow keys to restore line-mode editing. |
| SET FUNCTION MOVE | KP9 | Redefines the arrow keys to move a selected window to a specified position on the display screen. For example, the ↑, ↓, →, and ← arrow keys are redefined as MOVE UP 1, MOVE DOWN 1, MOVE RIGHT 1, and MOVE LEFT 1, respectively. |
| SET FUNCTION PAN | KP7 | Redefines the arrow keys to rotate the display. For example, the ↑, ↓, →, and ← arrow keys are redefined as PAN UP 1, PAN DOWN 1, PAN RIGHT 1, and PAN LEFT 1, respectively. |

(continued on next page)

SHOW CLUSTER Keypad Commands

B.1 Using the Keypad

Table B-1 (Cont.) SHOW CLUSTER Keypad Commands

| Command | Key or Key Sequence | Description |
|------------------------|---------------------|--|
| SET FUNCTION SCROLL | KP8 | Resets the arrow keys to scroll the screen display. For example, if you press the SET FUNCTION SCROLL key, the ↑, ↓, →, and ← arrow keys are redefined as SCROLL UP 1, SCROLL DOWN 1, SCROLL RIGHT 1, and SCROLL LEFT 1, respectively. |
| WRITE | KP3 | Outputs the current display to either a file name that you specify, or to the default output file name SHOW_CLUSTER.LIS. |

B.2 Redefining the Keypad Keys

You use the DEFINE/KEY command to change the definition of a key. See the DEFINE/KEY command in the Command Section of Chapter 4 for more information.

B.3 Redefining the Arrow Keys

By default, the SHOW CLUSTER arrow keys are set to the EDIT function. This means that you can perform command line editing at the command prompt that is similar to DCL line-mode editing. For example, the left arrow key moves the cursor to the left, or the up arrow key recalls the previous command. See the *OpenVMS User's Manual* for information on DCL line-mode editing.

The SET FUNCTION keys, shown in the second row of the keypad, redefine the arrow keys to perform a specified function. You can reset the arrow keys from EDIT to PAN, SCROLL, or MOVE with the SET FUNCTION command. For example, if you press the SET FUNCTION SCROLL key, the ↑, ↓, →, and ← arrow keys are redefined as SCROLL UP 1, SCROLL DOWN 1, SCROLL RIGHT 1, and SCROLL LEFT 1, respectively. (See the Command Section of Chapter 4 for information on specific commands.)

Note

If you set the function to PAN, SCROLL, or MOVE, the arrow keys are no longer defined to perform DCL line-mode editing. Only one function can be enabled at a time. To restore line-mode editing once it has been changed to another function, enter the command SET FUNCTION EDIT.

System Parameters

This appendix describes the system parameters.

Note

Digital recommends that you use AUTOGEN to modify system parameters. In special cases, however, you can use a conversational boot to modify a parameter value temporarily. To change a parameter value permanently, you must edit MODPARAMS.DAT and run AUTOGEN. For instructions, see the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*.

C.1 How the Parameters are Described

System parameters can be grouped into categories, as shown in Section C.1.1. In addition, each parameter can have one or more attributes, listed in Attributes for Parameters. Each parameter also has a value. The parameters in this appendix are listed alphabetically along with the attributes they have.

C.1.1 Parameter Categories and Attributes

The system parameters can be divided into the following categories (see also Table C-1:

- ACP—Parameters associated with file system caches and Files-11 ancillary control processes (ACPs).
- CLUSTER—Parameters that affect VMScluster operation.
- JOB—Job control parameters.
- LGI—Login security parameters.
- PQL—Parameters associated with process creation limits and quotas.
- RMS—Parameters associated with OpenVMS RMS.
- SCS—Parameters that control System Communications Services (SCS) and port driver operation. The parameters that affect SCS operation have the prefix SCS. The parameters that affect the CI780/CI750 port driver have the prefix PA.
- SPECIAL—Special parameters used by Digital. These parameters should only be changed if recommended by Digital personnel, or if they are clearly stated to change in the installation guide or release notes of a Digital-supplied layered product. Section C.2.2 describes the special parameters.
- SYS—Parameters that affect overall system operation.

System Parameters

C.1 How the Parameters are Described

- TTY—Parameters associated with terminal behavior.

The user can also define four parameters: USERD1, USERD2, USER3, and USER4. USERD1 and USERD2 are dynamic.

Attributes for Parameters

Parameters can have one or more of the following attributes:

- AUTOGEN—AUTOGEN calculates and modifies values.
- DYNAMIC—Active values can be modified.
- FEEDBACK—FEEDBACK information available for AUTOGEN calculations.
- GEN—Affects the creation and initialization of data structures at bootstrap time.
- MAJOR—Most likely to require modification.

These attributes are noted in the detailed parameter descriptions in Section C.2.

Table C-1 lists system parameters according to category. Footnotes indicate dynamic and system-specific parameters.

Table C-1 System Parameters

| ACP Parameters | | |
|----------------------------|----------------------------|-----------------------------|
| ACP_BASEPRIO ¹ | ACP_DATACHECK ¹ | ACP_DINDXCACHE ¹ |
| ACP_DIRCACHE ¹ | ACP_EXTCACHE ¹ | ACP_EXTLIMIT ¹ |
| ACP_FIDCACHE ¹ | ACP_HDRCACHE ¹ | ACP_MAPCACHE ¹ |
| ACP_MAXREAD ¹ | ACP_MULTIPLE ¹ | ACP_QUOCACHE ¹ |
| ACP_REBLDSYSD | ACP_SHARE ¹ | ACP_SWAPFLGS ¹ |
| ACP_SYSACC ¹ | ACP_WINDOW ¹ | ACP_WORKSET ¹ |
| ACP_WRITEBACK ¹ | ACP_XQP_RES ¹ | |
| CLUSTER Parameters | | |
| ALLOCLASS | †CHECK_CLUSTER | DISK_QUORUM ¹ |
| DR_UNIT_BASE | EXPECTED_VOTES | LOCKDIRWT |
| MSCP_BUFFER | MSCP_CREDITS | MSCP_LOAD |
| MSCP_SERVE_ALL | NISCS_CONV_BOOT | NISCS_LOAD_PEA0 |
| NISCS_PORT_SERV | QDSKINTERVAL | QDSKSVOTES |
| RECNXINTERVAL ¹ | TAPE_ALLOCLASS | TMSCP_LOAD |
| VAXCLUSTER | VOTES | |
| JOB Parameters | | |
| DEFPRI ¹ | DEFQUEPRI ¹ | IJOBLIM ¹ |
| MAXQUEPRI ¹ | NJOBLIM ¹ | RJOBLIM ¹ |

¹Dynamic parameter

†VAX specific

(continued on next page)

System Parameters

C.1 How the Parameters are Described

Table C-1 (Cont.) System Parameters

| | | |
|-----------------------------------|-----------------------------|-----------------------------|
| LGI Parameters | | |
| LGI_BRK_DISUSER ¹ | LGI_BRK_LIM ¹ | LGI_BRK_TERM ¹ |
| LGI_BRK_TMO ¹ | LGI_CALLOUTS ¹ | LGI_HID_TIM ¹ |
| LGI_PWD_TMO ¹ | LGI_RETRY_LIM ¹ | LGI_RETRY_TMO ¹ |
| MULTIPROCESSING Parameters | | |
| MULTIPROCESSING | SMP_CPUS | SMP_LNGSPINWAIT |
| SMP_SANITY_CNT | SMP_SPINWAIT | |
| PQL Parameters | | |
| PQL_DASTLM ¹ | PQL_DBIOLM ¹ | PQL_DBYTLM ¹ |
| PQL_DCPULM ¹ | PQL_DDIOIM ¹ | PQL_DENQLM ¹ |
| PQL_DFILLM ¹ | PQL_DJTQUOTA | PQL_DPGFLQUOTA ¹ |
| PQL_DPRCLM ¹ | PQL_DTQELM ¹ | PQL_DWSDEFAULT |
| PQL_DWSEXTENT ¹ | PQL_DWSQUOTA ¹ | PQL_MASTLM ¹ |
| PQL_MBIOLM ¹ | PQL_MBYTLM ¹ | PQL_MCPULM ¹ |
| PQL_MDIOLM ¹ | PQL_MENQLM ¹ | PQL_MFILLM ¹ |
| PQL_MJTQUOTA | PQL_MPGFLQUOTA ¹ | PQL_MPRCLM ¹ |
| PQL_MTQELM ¹ | PQL_MWSDEFAULT | PQL_MWSEXTENT ¹ |
| PQL_MWSQUOTA ¹ | | |
| RMS Parameters | | |
| RMS_DFMBC ¹ | RMS_DFMBFSDK ¹ | RMS_DFMBFSMT ¹ |
| RMS_DFMBFSUR ¹ | RMS_DFMBFREL ¹ | RMS_DFMBFIDX ¹ |
| RMS_DFMBFHS ¹ | RMS_DFNBC ¹ | RMS_PROLOGUE ¹ |
| RMS_EXTEND_SIZE ¹ | RMS_FILEPROT | RMS_GBLBUFQUO ¹ |
| SCS Parameters | | |
| PAMAXPORT ¹ | PANOPOLL ¹ | PANUMPOLL ¹ |
| PAPOLLINTERVAL ¹ | PAPOOLINTERVAL ¹ | PASANITY ¹ |
| PASTDGBUF | PASTIMOUT ¹ | PRCPOLINTERVAL ¹ |
| SCSBUFFCNT | SCSCONNCNT | SCSFLOWCUSH ¹ |
| SCSMAXDG | SCSMAXMSG | SCSNODE |
| SCSRESPCNT | SCSSYSTEMID | SCSSYSTEMIDH |
| TIMVCFAIL ¹ | UDABURSTRATE | |
| Special Parameters | | |

¹Dynamic parameter

(continued on next page)

System Parameters

C.1 How the Parameters are Described

Table C-1 (Cont.) System Parameters

| Special Parameters | | |
|----------------------------|-----------------------------|----------------------------|
| AFFINITY_SKIP | AFFINITY_TIME | †BREAKPOINTS |
| CHANNELCNT | †CLOCK_INTERVAL | CONCEAL_DEVICES |
| CTLIMGLIM | CTLPAGES | DLCKEXTRASTK |
| DNVOSI1 | EXUSRSTK | ‡GH_RSRVPAGCNT |
| IMGIOCNT | IOTA | LOCKRETRY |
| †MAXCLASSPRI | †MINCLASSPRI | MPW_PPIO |
| NOAUTOCONFIG ¹ | NOCLUSTER | NOPGFLSWP |
| PAGTBLPFC | PE | ‡PFN_COLOR_COUNT |
| †PFRATS | ‡PHYSICAL_MEMORY | †PHYSICALPAGES |
| PIOPAGES | PIXSCAN | POOLCHECK |
| POOLPAGING | PRIORITY_OFFSET | †PSEUDOLOA |
| QBUS_MULT_INTR | RESALLOC | RSRVPAGCNT |
| S0_PAGING | SA_APP | SBIERRENABLE |
| †SCH_CTLFLAGS ¹ | †SCSI_NOAUTO ¹ | SSINHIBIT |
| SMP_CPUSH | SMP_TICK_CNT | SWPALLOCINC |
| SWPFAIL | SWPRATE | SWP_PPIO |
| SYSPFC | TAILORED | TBSKIPWSL |
| ‡VCC_FLAGS | ‡VCC_MAXSIZE | VMS |
| WRITABLESYS | WRITESYSPARAMS ¹ | XQPCTL2 |
| XQPCTLD1 | | |
| SYS Parameters | | |
| AWSMIN ¹ | AWSTIME ¹ | BALSETCNT |
| †BOOT_STYLE ¹ | BORROWLIM ¹ | BUGCHECKFATAL ¹ |
| BUGREBOOT ¹ | CLASS_PROT ¹ | CLISYMTBL ¹ |
| †CRD_CONTROL | DEADLOCK_WAIT ¹ | DEFMBXBUFQUO ¹ |
| DEFMBXMXMSG ¹ | DEFPRI ¹ | DISMOUMSG ¹ |
| DORMANTWAIT ¹ | DUMPCBUG | DUMPSTYLE ¹ |
| ERLBUFFERPAGES | ERRORLOGBUFFERS | EXTRACPU ¹ |
| FREEGOAL ¹ | FREELIM | GBLPAGES |
| GBLPAGFIL | GBLSECTIONS | GROWLIM ¹ |
| ‡GH_EXEC_CODE | ‡GH_EXEC_DATA | ‡GH_RES_CODE |
| ‡GH_RES_DATA | ‡IMGREG_PAGES | †INTSTKPAGES |
| ‡KSTACKPAGES | †LAMAPREGS | LNMPHASHTBL |
| LNMSHASHTBL | LOAD_PWD_POLICY | LOAD_SYS_IMAGES |
| LOCKIDTBL | LOCKIDTBL_MAX ¹ | LONGWAIT ¹ |

¹Dynamic parameter

†VAX specific

‡Alpha specific

(continued on next page)

Table C-1 (Cont.) System Parameters

| SYS Parameters | | |
|--------------------------------|----------------------------|------------------------------|
| MAXBUF ¹ | MAXPROCESSCNT | MAXSYSGROUP ¹ |
| MINWSCNT | MMG_CTLFLAGS ¹ | MPW_HILIMIT |
| MPW_IOLIMIT | MPW_LOLIMIT | MPW_LOWAITLIMIT ¹ |
| MPW_THRESH ¹ | MPW_WAITLIMIT ¹ | MPW_WRTCLUSTER |
| MVTIMEOUT ¹ | NET_CALLOUTS ¹ | †NICS_LAN_OVRHD |
| †NICS_MAX_PKTSZ | NPAGEDYN | NPAGEVIR |
| PAGEDYN | PAGFILCNT | PFCDEFAULT ¹ |
| PFRATH ¹ | PFRATL ¹ | PROCSECTCNT |
| QUANTUM ¹ | †REALTIME_SPTS | RESHASHTBL |
| SAVEDUMP | ‡RMTDGB_SCRATCH_PAGES | SECURITY_POLICY |
| SETTIME | SHADOWING | SHADOW_MAX_COPY ¹ |
| SHADOW_MBR_TMO ¹ | SHADOW_SYS_DISK | SHADOW_SYS_TMO |
| SHADOW_SYS_WAIT | SHADOW_SYS_UNIT | †SPTREQ |
| STARTUP_P1-8 | SWPFILCNT | SWPOUTPGCNT ¹ |
| SYSMWCNT | ‡SYSTEM_CHECK | TAPE_MVTIMEOUT ¹ |
| TIMEPROMPTWAIT | UAFALTERNATE | †VBN_CACHE_S ¹ |
| †VBSS_ENABLE | VECTOR_MARGIN ¹ | VECTOR_PROC |
| VIRTUALPAGECNT | VOTES | WINDOW_SYSTEM ¹ |
| WSDEC ¹ | WSINC ¹ | WSMAX |
| WS_OPA0 | XFMAXRATE ¹ | ‡ZERO_LIST_HI ¹ |
| TTY Parameters | | |
| TTY_ALTALARM | TTY_ALTYPAHD | TTY_AUTOCHAR ¹ |
| TTY_BUF | TTY_CLASSNAME | TTY_DEFCHAR |
| TTY_DEFCHAR2 | TTY_DIALTYPE | TTY_DMASIZE ¹ |
| TTY_PARITY | TTY_RSPEED | TTY_SCANDelta |
| TTY_SILOTIME | TTY_SPEED | TTY_TIMEOUT ¹ |
| TTY_TYPAHDSZ | | |
| ¹ Dynamic parameter | | |
| †VAX specific | | |
| ‡Alpha specific | | |

C.1.2 Values for Parameters

Each parameter has associated default, minimum, and maximum values that define the scope of allowable values. To determine these values, invoke SYSGEN and enter a SHOW [parameter-name] command (with appropriate qualifiers). For example, to display the values for WSMAX, you can specify SHOW WSMAX; to display the values for the TTY parameters, you can specify SHOW/TTY. You can also display parameters grouped by attributes. To display DYNAMIC parameters, for example, specify SHOW/DYNAMIC.

System Parameters

C.1 How the Parameters are Described

Default values for SYSGEN parameters allow booting on any supported OpenVMS configuration. SYSGEN displays these default values under the heading default when you enter the SYSGEN command SHOW [parameter-name] for one of the parameter categories or attributes. Reset the default parameter values with the USE DEFAULT command.

The computed, installed value referred to in this section is the value derived by the AUTOGEN command procedure. (See the *OpenVMS System Manager's Manual*.)

C.2 Parameter Descriptions

This section describes system parameters and provides guidelines to help you decide whether you should consider modifying the parameters. The following attributes are indicated for the parameters:

AUTOGEN—A
DYNAMIC—D
FEEDBACK—F
GEN—G
MAJOR—M

Section C.2.2 describes the SPECIAL system parameters.

Note

In versions of the operating system before Version 4.0, a separate process, the ancillary control process (ACP), performed file operations such as file opens, closes, and window turns. Version 4.0 introduced the XQP (extended QIO procedure), which allows every process on the system to perform these operations. Consequently, many ACP parameters are applicable only when Files-11 On-Disk Structure Level 1 disks are mounted or when an ACP is specifically requested during a mount command. For compatibility reasons, the names of the parameters have not changed.

C.2.1 System Parameters

This section describes the parameters in all of the categories except the SPECIAL system parameters, which are described in Section C.2.2.

ACP_BASEPRIO (D)

ACP_BASEPRIO sets the base priority for all ACPs. The DCL command SET PROCESS/PRIORITY can be used to reset the base priorities of individual ACPs. ACP_BASEPRIO is not applicable for XQPs.

ACP_DATACHECK (D)

ACP_DATACHECK enables verification of reading and writing of file structure data (for example, directories and file headers). You can specify the following values:

| Bit | Description |
|-----|-------------|
| 0 | No checks |

| Bit | Description |
|-----|-----------------------|
| 1 | Read check only |
| 2 | Write check only |
| 3 | Read and write checks |

On a read check, the XQP information is read twice and compared. On a write check, the XQP information is written, and then read and compared.

ACP_DINDXCACHE (D,F)

ACP_DINDXCACHE controls the size of the directory index cache and the number of buffers used on a cachewide basis. In addition, ACP_DINDXCACHE builds a temporary index into the directory file, thereby reducing search time and directory header lookup operations. This parameter replaces the ACP_SYSACC parameter for Files-11 ODS-2 disks.

ACP_DIRCACHE (D,F)

ACP_DIRCACHE sets the number of pages for caching directory blocks. Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the directory data block cache.

ACP_EXTCACHE (D)

ACP_EXTCACHE sets the number of entries in the extent cache. Each entry points to one contiguous area of free space on disk. A specification of 0 means no cache. Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the extent cache.

ACP_EXTLIMIT (D)

ACP_EXTLIMIT specifies the maximum amount of free space to which the extent cache can point, expressed in thousandths of the currently available free blocks on the disk. For example, if available free space on the disk is 20,000 blocks, a specification of 10 limits the extent cache to 200 blocks.

The computed, installed value is usually adequate. Users with four or more VAXcluster node systems may want to adjust this parameter.

ACP_FIDCACHE (D)

ACP_FIDCACHE sets the number of file identification slots cached. A specification of 1 means no cache. Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the FID caches.

ACP_HDRCACHE (D,F)

ACP_HDRCACHE sets the number of pages for caching file header blocks. Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the file header caches.

ACP_MAPCACHE (D,F)

ACP_MAPCACHE sets the number of pages for caching index file bitmap blocks. Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the bitmap cache.

ACP_MAXREAD (D)

ACP_MAXREAD sets the maximum number of directory blocks read in one I/O operation.

System Parameters

C.2 Parameter Descriptions

ACP_MULTIPLE (D)

ACP_MULTIPLE enables (1) or disables (0) the default creation of a separate disk XQP cache for each volume mounted on a different device type. Prior to Version 4.0, a separate ACP process was created for each device type if this parameter was enabled. Because ACP operations are now handled by the per process XQP, such separate processes are no longer created. In general, having multiple caches is unnecessary. One large cache is more efficient than several small ones. ACP_MULTIPLE can be overridden on an individual-volume basis with the DCL command MOUNT.

ACP_QUOCACHE (A, D)

ACP_QUOCACHE sets the number of quota file entries cached. A specification of 0 means no cache. Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the quota caches.

ACP_REBLDSYSD

ACP_REBLDSYSD specifies whether the system disk should be rebuilt if it was improperly dismounted with extent caching, file number caching, or disk quota caching enabled. The ACP_REBLDSYSD default value (1) ensures that the system disk is rebuilt. Setting the value to 0 means the disk is not rebuilt.

Depending on the amount of caching enabled on the volume before it was dismounted, the rebuild operation may consume a considerable amount of time. Setting the value of ACP_REBLDSYSD to 0 specifies that the disk should be returned to active service immediately. If you set ACP_REBLDSYSD to 0, you can enter the DCL command SET VOLUME/REBUILD at any time to rebuild the disk.

ACP_SHARE (D)

ACP_SHARE enables (0) or disables (1) the creation of a global section for the first ACP used, enabling succeeding ACPs to share its code. This parameter should be set on 0 when ACP_MULTIPLE is on.

ACP_SWAPFLGS (A, D)

ACP_SWAPFLGS enables or disables swap through the value of a 4-bit number for the following four classes of ACPs:

| Bit | Class of ACP |
|-----|-------------------------------|
| 0 | Disks mounted by MOUNT/SYSTEM |
| 1 | Disks mounted by MOUNT/GROUP |
| 2 | Private disks |
| 3 | Magnetic tape ACP |

If the value of the bit is 1, the corresponding class of ACPs can be swapped. The value of decimal 15 (hexadecimal F—all bits on) enables swap for all classes of ACP. A value of decimal 14 disables swap for ACPs for volumes mounted with the /SYSTEM qualifier but leaves swap enabled for all other ACPs. Note that one will only have disk ACPs present if they are specifically requested at mount time or if a Files-11 On-Disk Structure Level 1 disk is mounted. In general, only bit 3 is significant because usually no file ACPs exist.

ACP_SYSACC (A, D)

ACP_SYSACC sets the number of directory file control blocks (FCBs) that will be cached for disks mounted with the /SYSTEM qualifier. Each directory FCB contains a 16-byte array containing the first letter of the last entry in each block of the directory (or group of blocks if the directory exceeds 16 blocks). Since entries in a directory are alphabetical, the cached FCB provides quick access to a required directory block. This parameter value should be roughly equivalent to the number of directories that will be in use concurrently on each system volume. It may be overridden on a per-volume basis with the /ACCESSED qualifier to the DCL command MOUNT. The value should be kept low in systems with small physical memory and little file activity, because the FCBs require a significant amount of space in the nonpaged dynamic pool.

Too small a value causes excessive XQP I/O operations, while too large a value causes excessive physical memory to be consumed by the FCB caches.

ACP_WINDOW (D)

ACP_WINDOW sets the default number of window pointers to be allocated in a window for a default file access, for disks mounted with the /SYSTEM qualifier.

ACP_WORKSET (D)

ACP_WORKSET sets the default size of a working set for an ACP. A value of 0 permits the ACP to calculate the size. This value should be nonzero only on small systems where memory is tight. Too small a value causes excessive ACP page, while too large a value causes excessive physical memory to be consumed by the ACP. Note that this parameter has no effect on the per-process XQP.

ACP_WRITEBACK (D)

ACP_WRITEBACK enables writeback caching. The default value of ACP_WRITEBACK is 1, which enables writeback caching. To disable writeback caching, set ACP_WRITEBACK to 0.

On ODS-2 disks, only PATHWORKS servers can use writeback caching. All other applications use writethrough caching.

ACP_XQP_RES

ACP_XQP_RES controls whether the XQP is currently in memory. The default value (1) specifies that the XQP is permanently in memory. Change the default only on restricted memory systems with a small number of users and little or no file activity that would require XQP intervention. Such activity includes file opens, closes, directory lookups, and window turns.

ALLOCLASS

ALLOCLASS determines the device allocation class for the system. The device allocation class is used to derive a common lock resource name for multiple access paths to the same device.

AWSMIN (D)

On VAX systems, AWSMIN establishes the lowest number of pages to which a working set limit can be decreased by automatic working set adjustment. ♦

VAX

System Parameters

C.2 Parameter Descriptions

Alpha

On Alpha systems, AWSMIN establishes the lowest number of pagelets to which a working set limit can be decreased by automatic working set adjustment. ♦

AWSTIME (D)

AWSTIME specifies the minimum amount of processor time that must elapse for the system to collect a significant sample of a working set's page fault rate. The time is expressed in units of 10 milliseconds. The default value of 20, for example, is 200 milliseconds.

Some application configurations that have a large number of memory-intensive processes may benefit if the value is reduced. The value can be as low as 4.

BALSETCNT (A,G,M)

BALSETCNT sets the number of balance set slots in the system page table. Each memory-resident working set requires one balance set slot.

VAX

On VAX systems, each balance set slot requires 4 bytes of permanently resident memory per page size. ♦

Alpha

On Alpha systems, each balance set slot requires 8 bytes of permanently resident memory per page size. ♦

You can monitor the active system with the DCL command SHOW MEMORY or the MONITOR PROCESSES command of the Monitor utility to determine the actual maximum number of working sets in memory. If this number is significantly lower than the value of BALSETCNT, this parameter value may be lowered. If all balance set slots are being used, raise the value of BALSETCNT.

BALSETCNT should never be set to a value higher than 2 less than MAXPROCESSCNT. If physical memory is a significant system constraint, you should consider lowering this value even further. However, if your system runs with a number of processes nearly equal to MAXPROCESSCNT, lowering BALSETCNT will force swapping to occur, which can affect system performance. Note that VBS can affect the values of BALSETCNT and MAXPROCESSCNT.

VAX

BOOT_STYLE (D)

On VAX systems, BOOT_STYLE is used in conjunction with the SNAPSHOT feature, which is used to reduce system startup time. BOOT_STYLE determines whether SYSBOOT should look for the file SNAPSHOT.SYS and load it into memory. Currently defined BOOT_STYLE values are as follows:

| Value | Description |
|-------|---|
| 0 | Normal boot |
| 1 | Boot from SYS\$LOADABLE_IMAGES:SNAPSHOT.SYS |
| 2 | Boot from specified file in the default directory SYS\$SPECIFIC:[SYS\$LDR] ♦ |

BORROWLIM (A,D,M)

BORROWLIM defines the minimum number of pages required on the free-page list before the system will permit process growth beyond the working set quota (WSQUOTA) for the process. This parameter should always be greater than FREELIM.

This parameter allows a process to grow beyond the value set by the working set quota (WSQUOTA) to the working set quota extent (WSEXTENT) on a system that has a substantial memory on the free-page list. This automatic working set adjustment also depends upon the values of parameters WSINC, PFRATH, and AWSTIME.

Working set growth attempts to alleviate heavy page faulting. To make use of this growth, you must also set the user's WSEXTENT authorization quota to a larger number than the WSQUOTA value.

BUGCHECKFATAL (D)

BUGCHECKFATAL enables or disables the conversion of nonfatal bugchecks into fatal bugchecks. The system must be rebooted on a fatal bugcheck. A nonfatal bugcheck places an entry only in the error log and deletes the corresponding process.

This parameter should normally be off (0); you should set it on (1) only when the executive is being debugged.

BUGREBOOT (D)

BUGREBOOT enables or disables automatic rebooting of the system if a fatal bugcheck occurs. This parameter should normally be on (1); set it off (0) only when the executive is being debugged.

VAX

CHECK_CLUSTER

On VAX systems, VAXCLUSTER parameter sanity check. When CHECK_CLUSTER is set to 1, SYSBOOT will output a warning message and force a conversational boot if it detects the VAXCLUSTER parameter is set to 0.♦

CLASS_PROT (D)

CLASS_PROT performs the nondiscretionary classification checks. CLASS_PROT is also checked by XQP to determine if a classification block should be added to the header of any created files.

CLISYMTBL (D)

CLISYMTBL sets the size of the command interpreter symbol table, which controls the number of DCL or MCR symbols that can be created.

VAX

CRD_CONTROL

On VAX systems, CRD_CONTROL is a bit mask for Corrected Read Data (CRD) soft error control flags. These flags control the use of CRDERROR routines. The following bits are defined:

| Bit | Description |
|-----|--|
| 0 | Enables CRD processing for all systems. |
| 1 | Enables scrubbing (rewriting) of the memory location that induced the CRD. |
| 2 | Enables page replacement of the pages that exhibit repeated CRD errors. |
| 3 | Forces all memory pages to be included in the PFN database. On systems that contain more than 512 megabytes of memory, all of memory is mapped by the PFN database by default. This bit allows the mapping to occur on systems with less than 512 megabytes of memory. |

The default is 7, which enables CRD processing, scrubbing, and page replacement.

CRD_CONTROL replaces the memory CRD control parameter CRDENABL.♦

System Parameters

C.2 Parameter Descriptions

Alpha

CRDENABLE

On Alpha systems, CRDENABLE enables or disables detection and logging of memory-corrected read data (ECC) errors. This parameter should normally be on (1).♦

DEADLOCK_WAIT (D)

DEADLOCK_WAIT defines the number of seconds that a lock request must wait before the system initiates a deadlock search on behalf of that lock. Setting DEADLOCK_WAIT to 0 disables deadlock checking. Setting DEADLOCK_WAIT to a value greater than 0 but still less than the default setting provides faster detection of deadlocks but requires more CPU usage.

DEFMBXBUFQUO (D)

DEFMBXBUFQUO sets the default for the mailbox buffer quota size in bytes when this value is not specified in a Create Mailbox (\$CREMBX) system service call.

DEFMBXMXMSG (D)

DEFMBXMXMSG sets the default for the mailbox maximum message size in bytes when this value is not specified in a Create Mailbox (\$CREMBX) system service call.

DEFPRI (D)

DEFPRI sets the base default priority for processes.

DEFQUEPRI (D)

DEFQUEPRI establishes the scheduling priority for jobs entered in batch and output (printer, server, and terminal) queues when no explicit scheduling priority is specified by the submitter. The value of this parameter can range from 0 to 255; the default value is 100.

The value of DEFQUEPRI should be less than or equal to MAXQUEPRI.

Note

DEFQUEPRI refers to relative queue scheduling priority, not the execution priority of the job.

DISK_QUORUM (D)

The DISK_QUORUM parameter is the name of an optional quorum disk in ASCII. ASCII spaces indicate that no quorum disk is being used.

DISMOUMSG (D)

DISMOUMSG controls whether the messages that log volume dismounts appear on the operator's terminal and in the operator's log. The default value of 0 disables the reporting of these messages; a value of 1 enables reporting of messages.

DORMANTWAIT (D)

DORMANTWAIT specifies, in seconds, the amount of time that can elapse without a significant event before the system treats a low-priority computable process as a DORMANT process for scheduling purposes. (A low-priority process is a non-real-time process whose current priority is equal to or less than the value specified by the SYSGEN parameter DEFPRI [default=4].) After SUSP

(suspended) processes, DORMANT processes are the most likely candidates for memory reclamation by the swapper.

DR_UNIT_BASE (G)

DR_UNIT_BASE specifies the base value from which unit numbers for DR devices (Digital StorageWorks RAID Array 200 Family logical RAID drives) are counted.

DR_UNIT_BASE provides a way for unique RAID device numbers to be generated. DR devices are numbered starting with the value of DR_UNIT_BASE and then counting from there. For example, setting DR_UNIT_BASE to 10 will produce device names such as \$1\$DRA10, \$1\$DRA11, and so on.

Setting DR_UNIT_BASE to appropriate, nonoverlapping values on all cluster members that share the same (nonzero) allocation class will ensure that no two RAID devices are given the same name.

DUMPBUG

DUMPBUG enables (1) or disables (0) the writing of error log buffers and memory contents to SYS\$SYSTEM:SYSDUMP.DMP when a fatal bugcheck occurs. This parameter should be off (0) only when the executive is being debugged.

DUMPSTYLE (A,D)

DUMPSTYLE specifies the method of writing system dumps.

DUMPSTYLE is a 32-bit mask with the following values. Remaining or undefined values are reserved to Digital.

| Value | Description |
|-------|---|
| 0 | The entire contents of physical memory will be written to the dump file. This is the default on Alpha systems. |
| 1 | The contents of memory will be written to the dump file selectively to maximize the utility of the dump file while conserving disk space. |
| 2 | The entire contents of physical memory will be written to the dump file with full console output. This is the default on VAX systems. |
| 3 | Selected portions of memory will be written to the dump file, as space permits, with full console output. |

If the dump file is large enough to contain the entire contents of physical memory, set DUMPSTYLE to 0 so that all of the information in physical memory is saved in the dump file.

If the dump file is too small to contain the entire contents of physical memory, set DUMPSTYLE to 1 to ensure that the most important pieces of memory will be written to the dump file first and to maximize the chance that the dump file will contain enough information for successful analysis.

VAX

On VAX systems, in certain restricted hardware configurations, the next four values can direct the system dump to a device other than the system disk.

| Value | Description |
|-------|---|
| 4 | The entire contents of physical memory will be written to the designated dump off system disk device, in the system specific root SYSDUMP.DMP file. |

System Parameters

C.2 Parameter Descriptions

| Value | Description |
|-------|--|
| 5 | The contents of memory will be written selectively to the designated dump off system disk device, in the system specific root SYSDUMP.DMP file. This will maximize the utility of the dump file while conserving disk space. |
| 6 | The entire contents of physical memory will be written to the designated dump off system disk device, in the system specific root SYSDUMP.DMP file, providing full, historical, console output. |
| 7 | The entire contents of physical memory will be written to the designated dump off system disk device, in the system specific root SYSDUMP.DMP file, providing full, historical, console output. ♦ |

Alpha

On Alpha systems, specify one of the following values (remaining or undefined values are reserved to Digital):

| Value | Description |
|-------|--|
| 0 | The entire contents of physical memory will be written to the dump file with minimal console output. |
| 1 | Selected portions of memory will be written to the dump file as space permits with minimal console output. |
| 2 | The entire contents of physical memory will be written to the dump file with full console output. |
| 3 | Selected portions of memory will be written to the dump file as space permits with full console output. ♦ |

ERLBUFFERPAGES

ERLBUFFERPAGES specifies the amount of memory to allocate for each buffer requested by the ERRORLOGBUFFERS parameter.

VAX

On VAX systems, ERLBUFFERPAGES parameter has a default value of 2 pages and a maximum value of 32 pages. ♦

Alpha

On Alpha systems, ERLBUFFERPAGES has a default value of 4 pagelets and a maximum value of 32 pagelets. ♦

ERRORLOGBUFFERS

ERRORLOGBUFFERS specifies the amount of physical memory (in pages) reserved for system error log entries. If ERRORLOGBUFFERS is too low, messages might not be written to the error log file. If it is too high, too many physical pages can be consumed by the error log buffers.

If you increase ERRORLOGBUFFERS, you must also increase the size of the system dump file. ♦

VAX

On VAX systems, if you increase the value of ERRORLOGBUFFERS by 2, you must increase the size of the dump file by 4 blocks. ♦

Alpha

On Alpha systems, if you increase the value of ERRORLOGBUFFERS by 2, you must increase the size of the dump file by 8 blocks. ♦

EXPECTED_VOTES (A)

EXPECTED_VOTES specifies the maximum number of votes that may be present in a cluster at any given time. Set it to a value that is equal to the sum of the vote parameters of all VAXcluster members, plus any votes that are contributed by the quorum disk. This value is used to automatically derive the number of votes that must be present for the cluster to function (quorum).

EXTRACPU (D)

EXTRACPU sets the time, in units of 10 milliseconds, allotted to each of a process's exit handlers (for each access mode) after the process times out (that is, reaches its CPU time limit).

FREEGOAL (A,D,M)

FREEGOAL establishes the number of pages that you want to reestablish on the free-page list following a system memory shortage. Memory shortages occur when the system drops below the minimum number of pages required on the free-page list (FREELIM). The value of FREEGOAL must always be greater than or equal to the value of FREELIM.

FREELIM (A,M)

FREELIM sets the minimum number of pages that must be on the free-page list.

The system will write pages from the modified-page list, swap out working sets, or reduce the size of the working sets to maintain the minimum count.

While the larger free-page list generally means less page I/O, it also means less space for the balance set, which tends to result in more swap I/O. You can monitor the size of the free-page list, the amount of page, and the amount of swap with the MONITOR IO command of the Monitor utility.

GBLPAGES (F,G,M)

GBLPAGES sets the number of global page table entries allocated at bootstrap time. Each global section requires 1 global page table entry per section page, plus 2 entries, with the total rounded up to an even number.

The default value is sufficient for the images normally installed as shared in the system startup command procedures. Once the system is running and all global sections are created, you can examine the actual requirements with the /GLOBAL qualifier of the Install utility (INSTALL) and reduce the value of GBLPAGES accordingly. However, do not set the value of this parameter too low, because the page table entries use little permanently resident memory. If you plan to install many user images as shared, or if user programs are likely to create many global sections, you must increase the value of this parameter.

VAX

On VAX systems, the maximum value for GBLPAGES is 131072 (to allow for rounding the global page table to a page boundary). The default value for GBLPAGES is 15000 pages. ♦

Alpha

GBLPAGES has no maximum value on Alpha systems. The default value for GBLPAGES is 20000 pagelets. ♦

GBLPAGFIL

GBLPAGFIL defines the maximum number of systemwide pages allowed for global page-file sections (scratch global sections that can be used without being mapped to a file). These global page-file sections can be temporary, permanent, system, or group, and are allocated from the page file specified in the system process header at bootstrap time. When you allow pages for global page-file sections, you must increase the size of the page file accordingly.

Global page-file sections are created with the Create and Map Section (\$CRMPSC) system service without an explicit disk file. These sections are used for the RMS global buffers required for shared files. Users of shared files should note that global page-file sections cause both the global page table and the default system page file (PAGEFILE.SYS) to be used. If the value of GBLPAGFIL

System Parameters

C.2 Parameter Descriptions

is too small, \$CRMPSC issues an error message when you attempt to create global page-file sections.

You must have scratch global sections if you use RMS global buffers. Each file using global buffers requires, in the system page file, the file's bucket size multiplied by the number of global buffers for that file. If the file's bucket size varies, as with RMS indexed files, use the maximum bucket size. For shared sequential files, use the multiblock count of the first stream to perform the \$CONNECT service in place of the file's bucket size.

The default value for this parameter is adequate for most systems. However, if your site uses RMS global buffering to a significant extent, you may need to raise the value of GBLPAGFIL. Use the /GLOBAL qualifier of the Install utility to examine the number of pages consumed by RMS global buffers. The global sections used by RMS for global buffers have the prefix RMS\$ followed by 8 hexadecimal digits.

Global buffers are enabled with the DCL command SET FILE/GLOBAL_BUFFERS, which is described in the *OpenVMS DCL Dictionary*.

VAX

On VAX systems, the maximum value for GBLPAGFIL is 131072—128 (to allow for rounding the global page table to a page boundary).♦

GBLSECTIONS (F,G,M)

GBLSECTIONS sets the number of global section descriptors allocated in the system header at bootstrap time. Each global section requires one descriptor. Each descriptor takes 32 bytes of permanently resident memory.

The default value is sufficient for the images normally installed as shared in the system startup command procedures. Once the system is running and all global sections are created, you can examine the actual requirements with the /GLOBAL qualifier of the Install utility and reduce the value of GBLSECTIONS accordingly. However, the value of this parameter should not be set too low. If you plan to install many user images as shared, or if user programs are likely to create many global sections, you must increase the value of this parameter.

If the value of GBLSECTIONS is too small, you receive a message from the Install utility at system startup time or whenever you install images manually. Note that too large a value for GBLSECTIONS wastes physical memory.

Alpha

GH_EXEC_CODE (F)

On Alpha systems, GH_EXEC_CODE specifies the size in pages of the execlet code granularity hint region.♦

Alpha

GH_EXEC_DATA (F)

On Alpha systems, GH_EXEC_DATA specifies the size in pages of the execlet data granularity hint region.♦

Alpha

GH_RES_CODE (F)

On Alpha systems, GH_RES_CODE specifies the size in pages of the resident image code granularity hint region.♦

Alpha

GH_RES_DATA (F)

On Alpha systems, GH_RES_DATA specifies the size in pages of the resident image data granularity hint region.♦

Alpha

GH_RSRVPGCNT (F)

On Alpha systems, GH_RSRVPGCNT specifies the number of pages covered by granularity hints, which are to be reserved for use after the system has completed booting. At the end of the system startup, the image LDR\$WRAPUP executes and releases all unused portions of the granularity hint regions—if the SGN\$V_RELEASE_PFNS flag (bit 2) is set in the LOAD_SYS_IMAGES parameter.

If GH_RSRVPGCNT is nonzero, an attempt is made to reserve that many pages in the granularity hints region. The remaining pages, if any, are returned to the system for other uses. If the amount of free space is less than the value of GH_RSRVPGCNT, the remaining free space is made available, and the region is not expanded to satisfy the reservation request. ♦

GROWLIM (A,D,M)

GROWLIM sets the number of pages that the system must have on the free-page list so that a process can add a page to its working set when it is above quota. GROWLIM has no effect if the process is below its working set quota. GROWLIM acts as a fast shutoff to the working set extent mechanism based on the system's free memory.

IEEE_ADDRESS

IEEE_ADDRESS is reserved to Digital.

IEEE_ADDRESH

IEEE_ADDRESH is reserved to Digital.

IJOBLIM (D)

IJOBLIM sets the maximum number of interactive jobs that can be on the system concurrently. You can control the maximum number of concurrent interactive users on the system with the DCL command SET LOGINS/INTERACTIVE.

Alpha

IMGREG_PAGES

On Alpha systems, IMGREG_PAGES is the number of pages to reserve in P1 space for images to be installed with shareable address data. If IMGREG_PAGES is set to 0, no images are installed with shared address data. The default is 512. ♦

For more information, see the INSTALL section in the *OpenVMS System Manager's Manual*.

VAX

INTSTKPAGES (D,G,M)

On VAX systems, INTSTKPAGES sets the size of the interrupt stack in pages. Each page on the interrupt stack requires a page of permanently resident memory.

Use the default value of 6 unless interrupt-stack-not-valid exceptions occur. These may be caused by either an unusually large number of devices or a driver that requires a large amount of stack space. ♦

JOBCTLD

JOBCTLD is not normally altered by system managers, this word of debug flags is used in rolling upgrades of OpenVMS. If bit 0 is set, the queue manager will not start. The default is 0.

VAX

KFILSTCNT

On VAX systems, KFILSTCNT establishes the maximum number of known file lists that can be made known to the system. ♦

System Parameters

C.2 Parameter Descriptions

Alpha

KSTACKPAGES

On Alpha systems, KSTACKPAGES controls the number of pages allocated for process kernel stacks. ♦

VAX

LAMAPREGS (G)

On VAX systems, LAMAPREGS sets the number of UNIBUS map registers allocated to an LPA11 driver when the driver is loaded, and limits the registers for the driver to that number. A value of 0 permits dynamic allocation of an unlimited number of registers. ♦

LGI_BRK_DISUSER (D)

LGI_BRK_DISUSER turns on the DISUSER flag in the UAF record when an attempted break-in is detected, thus permanently locking out that account. The parameter is off (0) by default. You should set the parameter (1) only under extreme security watch conditions, because it results in severely restricted user service.

LGI_BRK_LIM (D)

LGI_BRK_LIM specifies the number of failures that can occur at login time before the system will take action against a possible break-in. The count of failures applies independently to login attempts by each user name, terminal, and node. Whenever login attempts from any of these sources reach the break-in limit specified by LGI_BRK_LIM, the system assumes it is under attack and will initiate evasive action as specified by the LGI_HID_TIM parameter. The minimum value is 1.

The default value is usually adequate.

LGI_BRK_TERM (D)

LGI_BRK_TERM causes the terminal name to be part of the association string for the terminal mode of break-in detection. When off (0), association is done on user name only. LGI_BRK_TERM is set by default (1). It should be cleared if physical terminal names are created dynamically (that is, if LAT is installed) and effective break-in detection is desired.

LGI_BRK_TMO (D)

LGI_BRK_TMO specifies the number of seconds that a user, terminal, or node is permitted to attempt a login before the system assumes that a break-in attempt is occurring and takes evasive action. Note that LGI_BRK_LIM may be exceeded before the LGI_BRK_TMO timeout and vice versa. The evasive action is specified by the LGI_HID_TIM parameter.

LGI_CALLOUTS (D)

LGI_CALLOUTS specifies the number of installation security policy callout modules to be invoked at each login. LGI_CALLOUTS must be set to 0 unless callout modules are present.

LGI_HID_TIM (D)

LGI_HID_TIM specifies the number of seconds that evasive action will persist following the detection of a possible break-in attempt. The system refuses to allow any logins during this period, even if a valid user name and password are specified.

LGI_PWD_TMO (D)

LGI_PWD_TMO specifies, in seconds, the period of time a user has to enter the correct system password (if used). LGI_PWD_TMO also establishes the timeout period for users to enter their personal account passwords at login time. In addition, when using the SET PASSWORD command, LGI_PWD_TMO specifies the period of time the system waits for a user to type in a new password, an old password, and the password verification.

LGI_RETRY_LIM (D)

LGI_RETRY_LIM specifies the number of retry attempts allowed for users attempting to log in. If this parameter is greater than 0, and a legitimate user fails to log in correctly because of typing errors, the user will not automatically lose the carrier. Instead (provided that LGI_RETRY_TMO has not elapsed), by pressing the Return key, the user is prompted to enter the user name and password again. Once the specified number of attempts has been made without success, the user loses the carrier. As long as neither LGI_BRK_LIM nor LGI_BRK_TMO has elapsed, the user can dial in again and reattempt login.

LGI_RETRY_TMO (D)

LGI_RETRY_TMO specifies the number of seconds allowed between login retry attempts after each login failure. (Users can initiate login retries by pressing the Return key.) This parameter is intended for use in conjunction with the LGI_RETRY_LIM parameter and gives dialup users a reasonable amount of time and number of opportunities to attempt logins before they lose the carrier.

LNMPHASHTBL (G)

LNMPHASHTBL sets the size of the process logical name hash table. Logical names are hashed using a function of the name length and contents. The LNMPHASHTBL parameter determines the number of entries for process-private logical names. The recommended setting is the average number of process-private logical names. Note that the hashed values are rounded up to the nearest power of 2.

LNMSHASHTBL (F,G)

LNMSHASHTBL sets the size of the system logical name hash table. Logical names are hashed using a function of the name length and contents. The LNMSHASHTBL parameter determines the number of entries for shareable logical names. These names include all names from the system, group, and job logical name tables. The recommended setting allows for one to four logical names per hash table entry. The default setting is usually adequate, unless your installation has a large number of groups, or many jobs are active simultaneously. In that case, an increase in the value of the next higher power of 2 might improve logical name translation performance. Note that the hashed values are rounded up to the nearest power of 2.

LOAD_PWD_POLICY

LOAD_PWD_POLICY controls whether the SET PASSWORD command attempts to use site-specific password policy routines, which are contained in the shareable image SYS\$LIBRARY:VMS\$PASSWORD_POLICY.EXE. The default is 0, which indicates not to use policy routines.

LOAD_SYS_IMAGES

LOAD_SYS_IMAGES controls the loading of system images described in the system image data file, VMS\$SYSTEM_IMAGES. This parameter is a bitmask.

System Parameters

C.2 Parameter Descriptions

VAX

On VAX systems, the following bit is defined:

| Bit | Description |
|----------------------------|---|
| 0 (SGN\$V_LOAD_SYS_IMAGES) | Enables loading alternate execlets specified in VMS\$SYSTEM_IMAGES.DATA.♦ |

Alpha

On Alpha systems, the following bits are defined:

| Bit | Description |
|----------------------------|--|
| 0 (SGN\$V_LOAD_SYS_IMAGES) | Enables loading alternate execlets specified in VMS\$SYSTEM_IMAGES.DATA. |
| 1 (SGN\$V_EXEC_SLICING) | Enables executive slicing. |
| 2 (SGN\$V_RELEASE_PFNS) | Enables releasing unused portions of the Alpha huge pages. |

These bits are on by default. Using conversational bootstrap exec slicing can be disabled.♦

LOCKDIRWT (A)

LOCKDIRWT determines the portion of lock manager directory that will be handled by this system. The default value is usually adequate.

LOCKIDTBL (F,M)

LOCKIDTBL sets the initial number of entries in the system Lock ID table and defines the amount by which the Lock ID table is extended whenever the system runs out of locks. One entry must exist for each lock in the system; each entry requires 4 bytes.

For simple timesharing systems, the default value is adequate. If your application uses many locks, as in the case of heavy RMS file sharing or a database management application, you should increase this parameter. When you change the value of LOCKIDTBL, examine the value of RESHASHTBL and change it if necessary.

(The OpenVMS Lock Management facility is described in the *OpenVMS System Services Reference Manual*.) You can monitor locks with the MONITOR LOCK command of the Monitor utility.

LOCKIDTBL_MAX (F,D,G,M)

LOCKIDTBL_MAX establishes the maximum size of the Lock ID table.

If you set this parameter value too low, programs receive the following error message:

```
%SYSTEM-E-NOLOCKID, no lock id. available
```

LONGWAIT (D,G,M)

LONGWAIT defines how much real time (in seconds) must elapse before the swapper considers a process to be temporarily idle. This parameter is applied to local event flag (LEF) and hibernate (HIB) waits to detect such conditions as an inactive terminal or ACP.

MAXBUF (D)

MAXBUF sets the maximum size of a buffered I/O transfer (card readers, console diskettes, line printers, mailboxes, and terminals). The space for a buffered I/O operation is allocated from the permanently resident nonpaged dynamic pool. Note that, for header information, the system adds from 16 to 512 bytes (depending on the device driver and the nature of the I/O) to a buffer at allocation time for header information. Therefore, the largest possible size transfer is reduced by this amount.

MAXPROCESSCNT (F,G,M)

MAXPROCESSCNT sets the number of process entry slots allocated at bootstrap time. One slot is required for each concurrent process on the system. Each slot requires 6 bytes of permanently resident memory.

The default value is normally configured to allow you to create the desired number of processes. If the following message appears, you will have to increase the value of MAXPROCESSCNT:

```
%SYSTEM-F-NOSLOT, No PCB to create process
```

MAXQUEPRI (D)

MAXQUEPRI determines the highest scheduling priority that can be assigned to jobs entered in batch and output (printer, server, and terminal) queues without the submitter process having OPER or ALTPRI privilege. The value of this parameter can range from 0 to 255; the default is 100. The value of MAXQUEPRI should be greater than or equal to DEFQUEPRI.

Note

MAXQUEPRI refers to relative queue scheduling priority, not the execution priority of the job.

MAXSYSGROUP (D)

MAXSYSGROUP sets the highest value that a group number can have and still be classified as a system UIC group number. Note that the specification is not in octal unless preceded by the %O radix indicator. This parameter is normally left at 8 (10 octal).

VAX

MINWSCNT

On VAX systems, MINWSCNT sets the minimum number of fluid pages (pages not locked in the working set) required for the execution of a process.

The value of MINWSCNT must provide sufficient space to execute any VAX instruction. Theoretically, the longest instruction requires 52 pages; however, all code can run with 20 fluid pages. An insufficient value may inhibit system performance or even put a process into an infinite loop on some instructions. ♦

Alpha

On Alpha systems, MINWSCNT sets the minimum number of pages required for the execution of a process. The default value is 20; the minimum value is 10. ♦

The value specified by MINWSCNT is added to the size of the process header to establish the minimum working set size.

System Parameters

C.2 Parameter Descriptions

MMG_CTLFLAGS (D)

MMG_CTLFLAGS is a bit mask used to enable and disable proactive memory reclamation mechanisms. The following values are defined:

| Bit | Description |
|-----|---|
| 0 | Reclamation enabled by trimming from periodically executing, but otherwise idle processes. This occurs when the size of the free list drops below two times FREEGOAL. |
| 1 | Reclamation enabled by outswapping processes that have been idle for longer than LONGWAIT seconds. This occurs when the size of the free list drops below FREEGOAL. |
| 2-7 | Reserved for future use. |

MPW_HILIMIT (A,G)

MPW_HILIMIT sets an upper limit for the modified-page list. When the list accumulates the number of pages specified by this limit, writing of the list begins. The pages that are written are then transferred to the free-page list.

If MPW_HILIMIT is too low, excessive page faulting can occur from the page file. If it is too high, too many physical pages can be consumed by the modified-page list.

If you increase MPW_HILIMIT, you might also need to increase MPW_WAITLIMIT. Note that if MPW_WAITLIMIT is less than MPW_HILIMIT, a system deadlock will occur. The values for the two parameters are normally equal.

MPW_IOLIMIT

MPW_IOLIMIT specifies the number of outstanding I/Os to the modified-page writer. The modified-page writer can have up to 127 I/Os outstanding. The default is 4.

Each I/O requires a permanent, nonpaged pool allocation (in bytes) equal to the following formula:

$$I/O \text{ request packet length} + (6 * MPW_WRTCLUSTER)$$

With the default MPW_WRTCLUSTER of 96, for example, you must allocate 772 bytes for each I/O.

MPW_LOLIMIT (A,G)

MPW_LOLIMIT sets a lower limit for the modified-page list. When writing of the list causes the number of pages on the list to drop to or below this limit, writing stops.

MPW_LOLIMIT ensures that a certain number of pages are available on the modified-page list for page faults. If the number is too small, the caching effectiveness of the modified-page list is reduced. If it is too high, less memory is available for processes, so that swap (and page) may increase.

MPW_LOWAITLIMIT (A,D)

MPW_LOWAITLIMIT specifies the threshold at which processes in the miscellaneous wait state MPWBUSY are allowed to resume.

MPW_LOWAITLIMIT increases system performance for fast processors with large memories by reducing the amount of time processes spend in the MPWBUSY wait state.

MPW_THRESH (A,D)

MPW_THRESH sets a lower bound of pages that must exist on the modified-page list before the swapper writes this list to acquire free pages. If this requirement is met, the swapper tries to write the modified-page list rather than taking pages away from or swapping out a process.

MPW_WAITLIMIT (A,D)

MPW_WAITLIMIT sets the number of pages on the modified-page list that will cause a process to wait until the next time the modified-page writer writes the modified list. This parameter limits the rate at which any single process can produce modified pages. If this value is less than MPW_HILIMIT, a system deadlock occurs. The value for this parameter is normally equal to MPW_HILIMIT.

MPW_WRTCLUSTER (G)

MPW_WRTCLUSTER sets the number of pages to be written during one I/O operation from the modified page list to the page file or a section file. The actual size of the cluster may be limited by the number of pages available for the I/O operation. This parameter can range in value from 16 to 120, in multiples of 8. Each page in the cluster requires 6 bytes of permanently resident memory.

If MPW_WRTCLUSTER is too small, it takes many I/O operations to empty the modified page list. If MPW_WRTCLUSTER is too large for the speed of the disk that holds the page file, other I/O operations are held up for the modified page list write.

VAX

On VAX systems, the MPW_WRTCLUSTER default value and maximum value is 120 512-byte pages; its minimum value is 16 512-byte pages. ♦

Alpha

On Alpha systems, the MPW_WRTCLUSTER default value is 64 8192-byte pages; its maximum value is 512 8192-byte pages; and its minimum value is 16 8192-byte pages. ♦

MSCP_BUFFER (F)

VAX

On VAX systems, MSCP_BUFFER specifies the number of pages to be allocated to the MSCP server's local buffer area. ♦

Alpha

On Alpha systems, MSCP_BUFFER specifies the number of pagelets to be allocated to the MSCP server's local buffer area. ♦

This buffer area is the space used by the server to transfer data between client systems and local disks.

MSCP_CREDITS

MSCP_CREDITS specifies the number of outstanding I/O requests that can be active from one client system.

MSCP_LOAD (A)

MSCP_LOAD controls the loading of the MSCP server during a system boot. Specify one of the following values:

| Value | Description |
|-------|---|
| 0 | Do not load the MSCP server. This is the default value. |

System Parameters

C.2 Parameter Descriptions

| Value | Description |
|-------|--|
| 1 | Load the MSCP server and serve disks as specified by the MSCP_SERVE_ALL parameter. |

MSCP_SERVE_ALL

MSCP_SERVE_ALL controls the serving of disks during a system boot. Specify one of the following values:

| Value | Description |
|-------|--|
| 0 | Do not serve any disks. This is the default. |
| 1 | Serve all available disks. |
| 2 | Serve only locally attached (nonHSC) disks. |

If the MSCP_LOAD system parameter is 0, MSCP_SERVE_ALL is ignored.

MULTIPROCESSING

MULTIPROCESSING controls loading of the system synchronization image.

On VAX systems, specify one of the following values:

VAX

| Value | Description |
|-------|--|
| 0 | Load the uniprocessing synchronization image SYSTEM_SYNCHRONIZATION_UNI.EXE. |
| 1 | Load the full-checking multiprocessing synchronization image SYSTEM_SYNCHRONIZATION.EXE if CPU type is capable of SMP and two or more CPUs are present on the system. Otherwise, load uniprocessing synchronization image. |
| 2 | Always load the full-checking version SYSTEM_SYNCHRONIZATION.EXE, regardless of system configuration or CPU availability. |
| 3 | Load the optimized streamlined multiprocessing image SYSTEM_SYNCHRONIZATION_SPC.EXE if CPU type is capable of SMP and two or more CPUs are present on the system. Otherwise, load uniprocessing synchronization image. The default value is 3. |
| 4 | Always load the streamlined multiprocessing image SYSTEM_SYNCHRONIZATION_MIN.EXE, regardless of system configuration or CPU availability. ♦ |

Alpha

On Alpha systems, specify one of the following values:

| Value | Description |
|-------|--|
| 0 | Load uniprocessing synchronization image SYSTEM_SYNCHRONIZATION_UNI.EXE. |
| 1 | Load full-checking multiprocessing synchronization image SYSTEM_SYNCHRONIZATION.EXE, if CPU type is capable of SMP and two or more CPUs are present on the system. |
| 2 | Always load the full-checking multiprocessing synchronization image, SYSTEM_SYNCHRONIZATION.EXE, regardless of system configuration or CPU availability. |

| Value | Description |
|-------|---|
| 3 | Load streamlined multiprocessing image SYSTEM_SYNCHRONIZATION_MIN.EXE if CPU type is capable of SMP and two or more CPUs are present on the system. The default value is 3. |
| 4 | Always load streamlined multiprocessing synchronization image SYSTEM_SYNCHRONIZATION_MIN.EXE, regardless of system configuration or CPU availability. ♦ |

MVTIMEOUT (D)

MVTIMEOUT is the time in seconds that a mount verification attempt continues on a given disk volume. If the mount verification does not recover the volume within that time, the I/O operations outstanding to the volume terminate abnormally.

NET_CALLOUTS (D)

NET_CALLOUTS is normally set to 0. A value of 255 indicates that no attempt is to be made to assign a new proxy connection to an active server, but that a new process must be started in order to be certain to invoke installation security policy callout modules in LOGINOUT.EXE. Values 1 thru 254 are reserved for future use.

NISCS_CONV_BOOT

NISCS_CONV_BOOT controls whether a conversational boot is permitted during a remote system boot. The default of 0 specifies that conversational boots are not permitted.

NISCS_LAN_OVRHD

NISCS_LAN_OVRHD defines the number of bytes that are reserved by NISCA for data reformatting or encapsulation in a local area network (LAN) packet. The reserved space in the packet allows devices, such as the DESNC, to perform their operations. Currently, this value must be non-zero only when NISCA is run in an environment that uses the DESNC for LAN data encryption. Refer to the description of the NISCS_MAX_PKTSZ parameter for interactions.

Digital recommends that NISCS_LAN_OVRVHD be set to the same value on all nodes in the cluster.

NISCS_LOAD_PEA0

NISCS_LOAD_PEA0 controls whether the NI-SCS port driver PEDRIVER is loaded during system boot. The default of 0 specifies that the PEDRIVER is not loaded.

NISCS_MAX_PKTSZ

NISCS_MAX_PKTSZ defines the size in bytes of the data area in the largest packet sent by NISCA on any local area network (LAN). PEDRIVER uses this value, together with the NISCS_LAN_OVRHD parameter, to compute the maximum amount of data to transmit in any LAN packet:

```

LAN packet size = LAN header (padded Ethernet format)
                  + NISCS_MAX_PKTSZ value
                  - NISCS_LAN_OVRHD value
                  + CRC or FCS

```


System Parameters

C.2 Parameter Descriptions

For performance reasons, PEDRIVER limits the packet size so that the packets can be allocated from a look-aside list in non-paged pool. The actual allocation includes the required data structure overhead used by PEDRIVER and the LAN drivers. However, look-aside lists are provided for the allocation sizes required when using maximum size packets on both Ethernet and FDDI. This allows PEDRIVER to take full advantage of these interconnects.

NISCS_PORT_SERV (A)

NISCS_PORT_SERV provides flag bits for PEDRIVER port services. Bits 0 and 1 set (decimal value 3) enables data checking. The remaining bits are reserved for future use.

NJOBLIM (D)

NJOBLIM establishes the limit for network jobs. The maximum number of jobs is 1024. The minimum is 0, and the default is 16.

NPAGEDYN (F,G,M)

NPAGEDYN sets the size of the nonpaged dynamic pool in bytes. This figure is rounded down to an integral number of pages. NPAGEDYN establishes the initial setting of the nonpaged pool size, but the pool size can be increased dynamically.

To set a value for this parameter, use AUTOGEN initially, and then monitor the amount of space actually used with the DCL command SHOW MEMORY/POOL /FULL.

Allowing this growth results in a minor physical memory penalty. If NPAGEDYN is underconfigured, the penalty is 4 percent of physical memory from the configured value to the actual value on the running system. You can decrease the value if too much space is unused and increase it if little space is unused.

NPAGEVIR (A, G)

NPAGEVIR defines the maximum size to which NPAGEDYN can be increased. If this value is too small, the system can hang. If NPAGEVIR is too large, the result is a penalty of 1 percent of physical memory for any unused growth space.

PAGEDYN (F,G,M)

PAGEDYN sets the size of the paged dynamic pool in bytes. The specified value is rounded down to an integral number of pages. Each page of paged dynamic pool adds 8 bytes of permanently resident memory to the system page table; the paged dynamic pool has no other direct memory requirements.

The paged dynamic pool is used to allocate storage for shared logical names, resident image headers, known file list entries, and RMS file-sharing structures. Substantial amounts of space for the pool can be overallocated with little effect on system performance.

The size of the paged pool can grow dynamically up to the maximum size that this parameter specifies.

PAGFILCNT (G)

PAGFILCNT defines the maximum number of page files that can be installed.

PAMAXPORT (D)

PAMAXPORT specifies the maximum port number to be polled on each CI and DSSI. The CI and DSSI port drivers poll to discover newly initialized ports or the absence/failure of previously responding remote ports.

A system will not detect the existence of ports whose port numbers are higher than this parameter's value. Thus, this parameter should be set to a value that is equal to or greater than the highest port number being used on any CI or DSSI connected to the system.

You can decrease this parameter to reduce polling activity if the hardware configuration has fewer than 16 ports. For example, if the CI or DSSI with the largest configuration has a total of 5 ports assigned to port numbers 0 through 4, you could set PAMAXPORT to 4.

If CI or DSSI devices are not configured on your system, this parameter is ignored.

The default for this parameter is 15 (poll for all possible ports 0 through 15). Digital recommends that you set this parameter to the same value on each cluster computer.

PANOPOLL (D)

Disables CI and DSSI polling for ports if set to 1. (The default is 0.) When PANOPOLL is set, a computer will not discover that another computer has shut down or powered down promptly and will not discover a new computer that has booted. This parameter is useful when you want to bring up a computer detached from the rest of the cluster for checkout purposes.

PANOPOLL is functionally equivalent to uncabling the system from the DSSI or star coupler. This parameter does not effect VMScluster communications via LAN.

The default value of 0 is the normal setting and is required if you are booting from an HSC controller or if your system is joining a VMScluster. This parameter is ignored if no CI or DSSI devices are configured on your system.

PANUMPOLL (D)

PANUMPOLL establishes the number of CI and DSSI ports to be polled each polling interval. The normal setting for PANUMPOLL is 16.

On systems with less powerful CPUs, the parameter may be useful in applications sensitive to the amount of contiguous time that the system spends at IPL 8. Reducing PANUMPOLL reduces the amount of time spent at IPL 8 during each polling interval, while increasing the number of polling intervals needed to discover new or failed ports.

If CI or DSSI devices are not configured on your system, this parameter is ignored.

PAPOLLINTERVAL (D)

Specifies, in seconds, the polling interval the CI port driver uses to poll for a newly booted computer, a broken port-to-port virtual circuit, or a failed remote computer.

This parameter trades polling overhead against quick response to virtual circuit failures. Digital recommends that you use the default value for this parameter.

Digital recommends that you set this parameter to the same value on each cluster computer.

PAPOOLINTERVAL (D)

Specifies, in seconds, the interval at which the port driver checks available nonpaged pool after a pool allocation failure.

System Parameters

C.2 Parameter Descriptions

This parameter trades faster response to pool allocation failures against increased polling overhead. Digital recommends that you use the default value for this parameter.

If CI or DSSI devices are not configured on your system, this parameter is ignored.

PASANITY (D)

PASANITY controls whether the CI and DSSI port sanity timers are enabled to permit remote systems to detect a system that has been hung at IPL 8 or above for 100 seconds. It also controls whether virtual circuit checking gets enabled on the local system. The TIMVCFAIL parameter controls the time (1-99 seconds).

PASANITY is normally set to 1 and should be set to 0 only when you are debugging with XDELTA or planning to halt the CPU for periods of 100 seconds or more.

PASANITY is only semidynamic. A new value of PASANITY takes effect on the next CI or DSSI port reinitialization.

If CI or DSSI devices are not configured on your system, this parameter is ignored.

PASTDGBUF (A)

The number of datagram receive buffers to queue initially for each CI or DSSI port driver's configuration poller; the initial value is expanded during system operation, if needed.

If CI or DSSI devices are not configured on your system, this parameter is ignored.

PASTIMOUT (D)

The basic interval at which the CI port driver wakes up to perform time-based bookkeeping operations. It is also the period after which a timeout will be declared if no response to a start handshake datagram has been received.

If CI or DSSI devices are not configured on your system, this parameter is ignored.

The default value should always be adequate.

VAX

PFCDEFAULT (A,D)

On VAX systems during execution of programs, PFCDEFAULT controls the number of image pages read from disk per I/O operation when a page fault occurs. The PFCDEFAULT maximum default value is 127 512-byte pages. ♦

Alpha

On Alpha systems during execution of programs, PFCDEFAULT controls the number of image pagelets read from disk per I/O operation when a page fault occurs. The PFCDEFAULT maximum default value is 2032 512-byte pagelets (127 8192-byte Alpha pages). ♦

The read I/O operations can take place from an image file or from the page file. The actual size of the cluster can be less than PFCDEFAULT, depending on the size of image sections and the pattern of page references.

The value should not be greater than one-fourth the default size of the average working set to prevent a single page fault from displacing a major portion of a working set. Too large a value for PFCDEFAULT can hurt system performance. PFCDEFAULT can be overridden on an image-by-image basis with the CLUSTER option of the OpenVMS linker.

PFRATH (D,M)

PFRATH specifies the page fault rate above which the limit of a working set will be automatically increased. The unit of measure is the number of faults per 10 seconds of processor time. At a setting of 120, for example, the system will automatically increase the limit of a working set if it is faulting more than 120 pages per 10 seconds. Decreasing the value of this parameter tends to increase the limits of the working sets, while increasing its value tends to decrease their limits.

VAX

On VAX systems, the default value is 120 page faults every 10 seconds.♦

Alpha

On Alpha systems, the default value is 8 page faults every 10 seconds.♦

PFRATL (D,M)

PFRATL specifies the page fault rate below which the limit of a working set is automatically decreased. The unit of measure is the number of faults per 10 seconds of processor time. At a setting of 1, for example, the system automatically decreases the limit of a working set if it is faulting less than 1 page every 10 seconds.

Increasing the value of this parameter tends to decrease the limits of the working sets, while decreasing its value tends to increase their limits.

PQL_DASTLM (D,G)

PQL_DASTLM sets the default limit on the number of pending ASTs for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DBIOLM (D,G)

PQL_DBIOLM sets the default buffered I/O count limit for the number of outstanding buffered I/O operations permitted to a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DBYTLM (D,G)

PQL_DBYTLM sets the default buffered I/O byte count limit for the amount of buffered space available to a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DCPULM (D,G)

PQL_DCPULM sets the default CPU time limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process). PQL_DCPULM specifies the time limit in increments of 10 milliseconds.

The default value of 0 imposes no limit on CPU time usage and is typically the correct value for this parameter.

PQL_DDIOLM (D,G)

PQL_DDIOLM sets the default direct I/O limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DENQLM (D,G)

PQL_DENQLM sets the default enqueue limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DFILLM (D,G)

PQL_DFILLM sets the default open file limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

System Parameters

C.2 Parameter Descriptions

PQL_DJTQUOTA (D)

PQL_DJTQUOTA sets the default job table byte count quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process). PQL_DJTQUOTA specifies the number of bytes of paged pool allocated to the job table. The default value is usually adequate, unless a large number of job logical names or temporary mailboxes are used.

PQL_DPGFLQUOTA (D,G)

PQL_DPGFLQUOTA sets the default page file quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DPRCLM (D,G)

PQL_DPRCLM sets the default subprocess limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DTQELM (D,G)

PQL_DTQELM sets the default number of timer queue entries for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DWSDEFAULT (A,G)

PQL_DWSDEFAULT sets the default working set size for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DWSEXTENT (A,D,G)

PQL_DWSEXTENT sets the default working set extent for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_DWSQUOTA (A,D,G)

PQL_DWSQUOTA sets the default working set quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MASTLM (D,G)

PQL_MASTLM sets a default limit on the minimum number of pending ASTs for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MBIOLM (D,G)

PQL_MBIOLM sets the minimum buffered I/O limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MBYTLM (D,G)

PQL_MBYTLM sets the minimum buffered I/O byte limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MCPULM (D,G)

PQL_MCPULM sets the minimum CPU time limit in increments of 10 milliseconds for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MDIOLM (D,G)

PQL_MDIOLM sets the minimum direct I/O limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MENQLM (D,G)

PQL_MENQLM sets the default limit on the minimum number of locks that can be queued at one time by a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MFILLM (D,G)

PQL_MFILLM sets the minimum open file limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MJTQUOTA (D)

PQL_MJTQUOTA sets the minimum job table byte count quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

VAX

PQL_MPGFLQUOTA (D,G)

On VAX systems, PQL_MPGFLQUOTA sets the minimum page file quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process). ♦

Alpha

On Alpha systems, PQL_MPGFLQUOTA sets the minimum pagelet file quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process). ♦

PQL_MPRCLM (D,G)

PQL_MPRCLM sets the minimum subprocess limit for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MTQELM (D,G)

PQL_MTQELM sets the minimum number of timer queue entries for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MWSDEFAULT (A,G)

PQL_MWSDEFAULT sets the minimum default working set size for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MWSEXTENT (A,D,G)

PQL_MWSEXTENT sets the minimum working set extent for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PQL_MWSQUOTA (A,D,G)

PQL_MWSQUOTA sets the minimum working set quota for a process created by the Create Process (\$CREPRC) system service or the DCL command RUN (Process).

PRCPOLINTERVAL (D)

PRCPOLINTERVAL specifies, in seconds, the polling interval used to look for Systems Communications Services (SCS) applications, such as the connection manager and mass storage control protocol disks, on other nodes. All discovered nodes are polled during each interval.

This parameter trades polling overhead against quick recognition of new systems or servers as they appear.

System Parameters

C.2 Parameter Descriptions

PRIORITY_OFFSET

PRIORITY_OFFSET specifies the difference in priority required by the scheduler for one process to preempt the current process. A value of 2, for example, would mean that if the current process was executing at priority 1, a computable process at priority 2 or 3 would not be allowed to preempt the current process. However, a priority 4 or higher process could preempt the current process. This mechanism only affects normal priority (0-15) processes. The default value is 0.

PROCSECTCNT (G)

PROCSECTCNT sets the number of section descriptors that a process can contain. Each section descriptor increases the fixed portion of the process header by 32 bytes.

You should set a value greater than the maximum number of image sections in any section to be run, as indicated by the linkage memory allocation map for the image.

PU_OPTIONS

PU_OPTIONS is reserved to Digital.

QDSKINTERVAL

QDSKINTERVAL establishes, in seconds, the disk quorum polling interval.

QDSKVOTES

QDSKVOTES specifies the number of votes contributed by a quorum disk in a cluster.

QUANTUM (D,M)

QUANTUM defines the following:

- Processor time—maximum amount of processor time a process can receive before control passes to another process of equal priority that is ready to compute
- Balance set residency—minimum amount of service a compute-state process must receive before being swapped out to secondary storage

VAX

REALTIME_SPTS (D,G,M)

On VAX systems, REALTIME_SPTS reserves a number of system page table entries for mapping connect-to-interrupt processes into system space. This value should normally remain at the default (0) in an environment that is not real-time. Where connect-to-interrupt processes do use the system, this value should represent the maximum number of pages that all concurrent connect-to-interrupt processes must map into system space. See the *OpenVMS VAX Device Support Manual* for details. ♦

RECNXINTERVAL (D)

RECNXINTERVAL establishes the polling interval, in seconds, during which to attempt reconnection to a remote system.

RESHASHTBL (F,M)

RESHASHTBL defines the number of entries in the lock management resource name hash table. Each entry requires 4 bytes. As a general guideline, one resource hash table entry should exist for every four locks in the system. Thus, RESHASHTBL should be one-quarter the value of LOCKIDTBL, rounded up to the closest power of 2.

RJOB LIM (D)

RJOB LIM defines the maximum number of remote terminals allowed in the system at any one time.

RMS_DFMBC (D)

RMS_DFMBC specifies the default disk block size used by RMS in accessing sequential files.

RMS_DFMBF HSH (D)

RMS_DFMBF HSH establishes the hashed multibuffer count.

RMS_DFMBFIDX (D)

RMS_DFMBFIDX establishes the default RMS multibuffer count for indexed sequential disk operations. This value defines the number of I/O buffers that RMS allocates for each indexed file. For sequential access, a larger number that allows some of the index buckets to remain in memory can improve performance.

RMS_DFMBFREL (D)

RMS_DFMBFREL establishes the default RMS multibuffer count for relative disk operations. This value defines the number of I/O buffers that RMS allocates for each relative file.

RMS_DFMBFSDK (D)

RMS_DFMBFSDK establishes the default RMS multibuffer count for sequential disk operations. This value defines the number of I/O buffers that RMS allocates for sequential disk files.

Normally the default value is adequate. However, if read-ahead or write/behind operations are used, a larger number will improve performance.

RMS_DFMBFSMT (D)

RMS_DFMBFSMT establishes the default RMS multibuffer count for magnetic tape operations. This value defines the number of I/O buffers that RMS allocates for magnetic tape files.

RMS_DFMBFSUR (D)

RMS_DFMBFSUR establishes the default multibuffer count for unit record devices.

RMS_DFNBC (D)

RMS_DFNBC specifies a default block count for network access to remote, sequential, indexed sequential, and relative files.

The network block count value represents the number of blocks that RMS is prepared to allocate for the I/O buffers used to transmit and receive data. The buffer size used for remote file access, however, is the result of a negotiation between RMS and the remote file access listener (FAL). The buffer size chosen is the smaller of the two sizes presented.

Thus, RMS_DFNBC places an upper limit on the network buffer size that is used. It also places an upper limit on the largest record that can be transferred to or from a remote file. In other words, the largest record that can be transferred must be less than or equal to RMS_DFNBC multiplied by 512 bytes.

System Parameters

C.2 Parameter Descriptions

RMS_EXTEND_SIZE (D)

RMS_EXTEND_SIZE specifies the number of blocks by which files are extended as they are written. This number should be chosen to balance the amount of extra disk space wasted at the ends of each file against the performance improvement provided by making large extents infrequently. When small disk quotas are used, a small number such as the disk cluster size should be specified to prevent the user's disk quota from being consumed. If the value of 0 is used, RMS will allocate large extents and truncate the file back to its actual usage when it closes.

RMS_FILEPROT

RMS_FILEPROT determines the default file protection for system processes such as those that create the error log, operator log, and job controller. It also determines default file protection for processes created by the job controller (all interactive and batch processes).

Because a process always inherits its default file protection from its creator process, **RMS_FILEPROT** determines default file protection only for users who do not execute the DCL command **SET PROTECTION/DEFAULT** in their login command procedures or during interactive sessions.

The protection is expressed as a mask. (See the discussion of the \$CRMPSC system service in the *OpenVMS System Services Reference Manual* for more information on specifying protection masks.) By default, the mask is 64000 (decimal) or FA00 (hexadecimal), which represents the following protection:

(S:RWED,O:RWED,G:RE,W:)

RMS_GBLBUFQUO (D)

RMS_GBLBUFQUO specifies the number of global buffers that can be allocated on the system at any one time.

RMS_PROLOGUE (D)

RMS_PROLOGUE specifies the default prologue RMS uses to create indexed files. The default value 0 specifies that RMS should determine the prologue based on characteristics of the file. A value of 2 specifies Prologue 2 or Prologue 1, and 3 specifies Prologue 3. The RMS prologues are described in the *OpenVMS Record Management Services Reference Manual*.

Alpha

RMTDBG_SCRATCH_PAGES

On Alpha systems, **RMTDBG_SCRATCH_PAGES** specifies how many pages of memory are allocated for the remote debugger. This memory is allocated only if remote debugging is enabled with the 8000 boot flag. Normally, the default value is adequate, but if the remote debugger issues an error message, you should increase this value. See the *OpenVMS Alpha Device Support Manual* for more information. ♦

SAVEDUMP

If the dump file is saved in the page file, **SAVEDUMP** specifies whether the page file is saved until the dump file is analyzed. The default value 0 specifies that the page file should not be saved. A value of 1 specifies that the file should be saved.

VAX

SCH_CTLFLAGS (D)

On VAX systems, the vector scheduling subsystem presently provides an enlarged quantum to processes requiring vector capability. Customer sites can disable vector quantum adjustment by setting bit NO_VEC_QUANTADJ (bit 9) in the system parameter SCH_CTLFLAGS. Setting this bit causes the scheduler to treat the vector processes and scalar processes uniformly. However, doing so will result in more frequent vector context switches when the number of vector processes exceeds the number of vector processors in the system. ♦

VAX

SCSBUFFCNT (F,G)

On VAX systems, SCSBUFFCNT is the number of buffer descriptors configured for all SCA. If a SCA device is not configured on your system, this parameter is ignored. Generally speaking, each data transfer needs a buffer descriptor and thus the number of buffer descriptors can be a limit on the number of possible simultaneous I/Os. Various performance monitors report when a system is out of buffer descriptors for a given workload which is an indication that a larger value for SCSBUFFCNT is worth considering. Note that AUTOGEN provides feedback for this parameter on VAX systems only. ♦

Alpha

On Alpha systems, the SCS buffers are allocated as needed, and SCSBUFFCNT is reserved to Digital. ♦

SCSCONNCNT (F,G)

SCSCONNCNT is the initial number of SCS connections that are configured for use by all system applications, including the one used by Directory Service Listen. The initial number will be expanded by the system if needed.

The default value is adequate for all CI and UDA hardware combinations. Note that AUTOGEN provides feedback for this parameter on VAX systems only.

SCSFLOWCUSH (D)

Specifies the lower limit for receive buffers at which point SCS starts to notify the remote SCS of new receive buffers. For each connection, SCS tracks the number of receive buffers available. SCS communicates this number to the SCS at the remote end of the connection. However, SCS does not need to do this for each new receive buffer added. Instead, SCS notifies the remote SCS of new receive buffers if the number of receive buffers falls as low as the SCSFLOWCUSH value.

The default value is adequate on most systems. If a SCA port is not configured on your system, this parameter is ignored.

SCSMAXDG (G)

This parameter is reserved for Digital use only.

SCSMAXMSG (G)

This parameter is reserved for Digital use only.

SCSNODE (G)

SCSNODE specifies the name of the computer. This parameter is not dynamic.

Specify SCSNODE as a string of up to six characters. Enclose the string in quotation marks.

If the computer is in a VMScluster, specify a value that is unique within the cluster. Do not specify the null string.

If the computer is running DECnet for OpenVMS, the value must be the same as the DECnet node name.

System Parameters

C.2 Parameter Descriptions

SCSRESPCNT (F,G)

SCSRESPCNT is the total number of response descriptor table entries (RDTEs) configured for use by all system applications.

If SCA or DSA ports are not configured on your system, this parameter is ignored.

SCSSYSTEMID (G)

Specifies a number that identifies the computer. This parameter is not dynamic. SCSSYSTEMID is the low-order 32 bits of the 48-bit system identification number.

If the computer is in a VMSCluster, specify a value that is unique within the cluster. Do not use zero as the value.

If the computer is running DECnet for OpenVMS, calculate the value from the DECnet address using the following formula:

$$\text{SCSSYSTEMID} = ((\text{DECnet area number}) * 1024) + (\text{DECnet node number})$$

Example: If the DECnet address is 2.211, calculate the value as follows:

$$\text{SCSSYSTEMID} = (2 * 1024) + 211 = 2259$$

SCSSYSTEMIDH (G)

Specifies the high-order 16 bits of the 48-bit system identification number. This parameter must be set to 0. It is reserved by Digital for future use.

SECURITY_POLICY

SECURITY_POLICY allows a system to run in a C2 or B1 configuration and subset out particular pieces of functionality that are outside of the evaluated configuration or to preserve compatibility with previous versions of the operating system. See the *OpenVMS VAX Guide to System Security* for further information on the C2 and B1 evaluated configurations.

The following bits are defined:

| Bit | Description |
|-----|---|
| 0 | Allows DECwindows Display PostScript extensions |
| 1 | Allows multiple user names to connect to DECW\$SERVER |
| 2 | Allows unevaluated DECwindows transports (such as TCP/IP) |
| 3 | Allows \$SIGPRC and \$PRCTERM to span job trees |
| 4 | Allows security profile changes to protected objects on a local node when the object server is absent and cannot update the cluster database VMS\$OBJECTS.DAT |
| 5 | Allows creation of protected objects on a local node when the object server is absent and cannot update the cluster database VMS\$OBJECTS.DAT |
| 6 | Allows SPAWN or LIB\$SPAWN commands in CAPTIVE accounts |

The default value of 7 preserves compatibility with existing DECwindows Motif behavior. A value of 0 disables all unevaluated configurations.

SETTIME

SETTIME enables (1) or disables (0) solicitation of the time of day each time the system is booted. This parameter should usually be off (0), so that the system sets the time of day at boot time to the value of the processor time-of-day register.

You can reset the time after the system is up with the DCL command SET TIME (see the *OpenVMS DCL Dictionary*).

SHADOWING

SHADOWING enables or disables shadowing and specifies the mode of shadowing operations that you want to enable. SHADOWING is a value that specifies the type of disk class driver that is loaded on the system: DUDRIVER, DSDRIVER, or SHDRIVER. See the *Volume Shadowing for OpenVMS* for more information about setting system parameters for volume shadowing.

Note

Digital does not support Phase I shadowing in OpenVMS Version 6.2. Use Phase II shadowing.

Specify one of the following values:

| Value | Description |
|-------|--|
| 0 | No shadowing is enabled; SHDRIVER is not loaded. This is the default value. |
| 2 | Phase II shadowing enabled. SHDRIVER is loaded. Phase II shadowing provides shadowing of all disks located on a standalone system or a OpenVMS cluster system. |

SHADOW_MAX_COPY (A,D)

Use this parameter for Phase II shadowing only. The value of SHADOW_MAX_COPY controls how many parallel copy threads are allowed on a given node. The value of SHADOW_MAX_COPY can range from 0 to 42. The default value is 4. Carefully consider the needs of each shadowed VAX node when setting this parameter. For example, the default value of 4 might be too high for a small satellite node and too low for a VAX node with substantial CPU power. Too high a value for SHADOW_MAX_COPY can affect performance by allowing too many copy threads to operate in parallel. Too low a value unnecessarily restricts the number of threads your system can effectively handle. See *Volume Shadowing for OpenVMS* for more information about setting system parameters for volume shadowing.

SHADOW_MBR_TMO (D)

SHADOW_MBR_TMO controls the amount of time the system tries to fail over physical members of a shadow set before removing them from the set. The SHADOW_MBR_TMO parameter replaces the temporary VMDS3 parameter used in prior releases. The SHADOW_MBR_TMO parameter is valid only for use with Volume Shadowing for OpenVMS (Phase II). You cannot set this parameter for use with VAX Volume Shadowing (Phase I).

Use the SHADOW_MBR_TMO parameter (a word) to specify the number of seconds, in decimal from 1 to 65,535, during which recovery of a repairable shadow set is attempted. If you do not specify a value or if you specify 0, the default delay of 20 seconds is used.

Because SHADOW_MBR_TMO is a dynamic parameter, you should use the SYSGEN command WRITE CURRENT to permanently change its value.

SHADOW_REMOVE_1

On Alpha systems, SHADOW_REMOVE_1 is reserved to Digital. ♦

Alpha

System Parameters

C.2 Parameter Descriptions

Alpha

SHADOW_REMOVE_2

SHADOW_REMOVE_2 is reserved to Digital. ♦

SHADOW_SYS_DISK

SHADOW_SYS_DISK enables (1) or disables (0) Phase II shadowing only. Disable the SHADOW_SYS_DISK parameter if the boot device is not a member of a Phase II shadow set. The default value is disabled. Enable this parameter if you want to shadow the boot device. All nodes booting off a particular system disk shadow set should set their SHADOW_SYS_DISK parameter to 1. See *Volume Shadowing for OpenVMS* for more information about setting system parameters for volume shadowing.

SHADOW_SYS_TMO

The SHADOW_SYS_TMO parameter has the following two distinct usages:

- At system boot time, when this is the *first* node in the cluster to boot and to create this specific shadow set. If the proposed shadow set is not currently mounted in the cluster, use this parameter to extend the time a booting system waits for all former members of the shadowed system disk to become available.
- Once the system successfully mounts the virtual unit and begins normal operations. In this usage, the SHADOW_SYS_TMO parameter controls the time the operating system waits for errant members of a system disk. (Use the SHADOW_MBR_TMO parameter to control the time the operating system waits for the errant members of an application disk.)

This parameter applies only to members of the system disk shadow set. All nodes using a particular system disk shadow set should have their SHADOW_SYS_TMO parameter set to the same value once normal operations begin.

The default value is 20 seconds. Change this parameter to a higher value if you want the system to wait more than the 20-second default for all members to join the shadow set. You can set the parameter value to 20 through 65,535 seconds.

SHADOW_SYS_UNIT

Use this parameter for Phase II shadowing only. The SHADOW_SYS_UNIT parameter is an integer value that contains the virtual unit number of the system disk. The default value is 0. The maximum value allowed is 9999. This parameter is effective only when the SHADOW_SYS_DISK parameter has a value of 1. This parameter should be set to the same value on all nodes booting off a particular system disk shadow set. See *Volume Shadowing for OpenVMS* for more information about setting system parameters for volume shadowing.

SHADOW_SYS_WAIT

The SHADOW_SYS_WAIT parameter extends the time a booting system waits for all current members of a mounted shadowed system disk to become available to *this* node. The shadow set must already be mounted by at least one other cluster node for this parameter to take effect.

The default value is 256 seconds. Change this parameter to a higher value if you want the system to wait more than the 256-second default for all members to join the shadow set. You can set the parameter value to 1 through 65,535 seconds.

SMP_CPUS

SMP_CPUS identifies which secondary processors, if available, are to be booted into the multiprocessing system at boot time. SMP_CPUS is a 32-bit mask; if the value of a bit in the mask is 1, the processor with the corresponding CPU ID

is booted into the multiprocessing system (if it is available). For example, if you want to boot only the CPUs with CPU IDs 0 and 1, specify the value 3 (both bits are on).

The default value of SMP_CPUS, -1, boots all available CPUs into the multiprocessing system.

Note that, although a bit in the mask corresponds to the primary processor's CPU ID, the primary processor is always booted. That is, if the mask is set to 0, the primary CPU will still boot. Any available secondary processors will not be booted into the multiprocessing system.

This parameter is ignored if the MULTIPROCESSING parameter is set to 0.

SMP_LNGSPINWAIT

Certain shared resources in a multiprocessing system take longer to become available than allowed for by the SMP_SPINWAIT parameter. SMP_LNGSPINWAIT establishes, in 10-microsecond intervals, the length of time a processor in a multiprocessing system waits for these resources. A timeout causes a CPUSPINWAIT bugcheck.

The default value is 3 seconds (300,000 10-microsecond intervals).

SMP_SANITY_CNT

SMP_SANITY_CNT establishes, in 10-millisecond intervals, the timeout period for each CPU in a symmetric multiprocessing (SMP) system. Each CPU in an SMP system monitors the sanity timer of one other CPU in the configuration to detect hardware or software failures. If allowed to go undetected, these failures could cause the cluster to hang. A timeout causes a CPUSANITY bugcheck.

The default value is 300 milliseconds (30 10-millisecond intervals).

SMP_SPINWAIT

SMP_SPINWAIT establishes, in 10-microsecond intervals, the amount of time a CPU in an SMP system normally waits for access to a shared resource. This process is called **spinwaiting**.

A timeout causes a CPUSPINWAIT bugcheck.

The default value is 100 milliseconds (10,000 10-microsecond intervals).

VAX

SPTREQ (A)

On VAX systems, SPTREQ sets the number of system page table (SPT) entries required for mapping the following components:

- Executive image
- RMS image
- SYMSG.EXE file
- Multiport memory structures
- Each MASSBUS adapter
- Each UNIBUS adapter
- Each DR32 adapter

The number of system page table entries required for all other purposes is automatically computed and added to the value of SPTREQ to yield the actual size of the system page table. ♦

System Parameters

C.2 Parameter Descriptions

STARTUP_P1-8

STARTUP_P1 specifies that a minimum sequence of system startup procedures be performed. STARTUP_P2 controls whether verification is set during the execution of a startup procedure. STARTUP_P3 through P8 are not yet implemented.

SWPFILCNT

SWPFILCNT defines the maximum number of swap files that can be installed.

VAX

SWPOUTPGCNT (A,D)

On VAX systems, SWPOUTPGCNT defines the minimum number of pages to which the swapper should attempt to reduce a process before swapping it out. The pages taken from the process are placed into the free-page list. ♦

Alpha

On Alpha systems, SWPOUTPGCNT defines the minimum number of pagelets to which the swapper should attempt to reduce a process before swapping it out. The pagelets taken from the process are placed into the free page list. ♦

This parameter allows the swapper an alternative mechanism before actually performing swaps.

SYSMWCNT (A,G,M)

SYSMWCNT sets the quota for the size of the system working set, which contains the pageable portions of the system, the paged dynamic pool, RMS, and the resident portion of the system message file.

While a high value takes space away from user working sets, a low value can seriously impair system performance. Appropriate values vary, depending on the level of system use. When the system is running at full load, check the rate of system faults with the MONITOR PAGE command of the Monitor utility. An average system page fault rate of between 0 and 3 page faults per second is desirable. If the system page fault rate is high, and especially if the system seems to be slow, you should increase the value of SYSMWCNT. However, do not set this parameter so high that system page faulting never occurs.

Alpha

SYSTEM_CHECK

On Alpha systems, SYSTEM_CHECK is used to investigate intermittent system failures by enabling a number of run-time consistency checks on system operation and recording some trace information.

Enabling SYSTEM_CHECK causes the system to behave as if the following system parameter values are set (although the values of the following parameters are not actually changed):

| Parameter | Value | Description |
|-----------------|------------|---|
| BUGCHECKFATAL | 1 | Crash the system on non-fatal bugchecks |
| POOLCHECK | %X616400FF | Enable all poolchecking, with an allocated pool pattern of %x61616161 ('aaaa') and deallocated pool pattern of x64646464 ('dddd') |
| MULTIPROCESSING | 2 | Enable full synchronization checking |

While SYSTEM_CHECK is enabled, the previous settings of the BUGCHECKFATAL and MULTIPROCESSING parameters are ignored. However, setting the parameter POOLCHECK to a nonzero value overrides the setting imposed by SYSTEM_CHECK.

Setting **SYSTEM_CHECK** creates certain image files that are capable of the additional system monitoring. These image files are located in **SYS\$LOADABLE_IMAGES** and can be identified by the suffix **_MON**.♦

TAILORED

TAILORED specifies whether or the system is tailored during installation. Digital recommends using the default value.

TAPE_ALLOCLASS

TAPE_ALLOCLASS determines the tape allocation class for the system. The tape allocation class is used to create a unique clusterwide device name for multiple access paths to the same tape.

The **TAPE_ALLOCLASS** parameter can also be used to generate a unique clusterwide name for tape devices with identical unit numbers.

TAPE_MVTIMEOUT (D)

TAPE_MVTIMEOUT is the time in seconds that a mount verification attempt will continue on a given magnetic tape volume. If the mount verification does not recover the volume within that time, the I/O operations outstanding to the volume will terminate abnormally.

TIME_CONTROL

TIME_CONTROL is reserved to Digital.

TIMEPROMPTWAIT

TIMEPROMPTWAIT defines the number of seconds that you want a VAX processor to wait for the time and date to be entered when a system boot occurs, if the processor's time-of-year clock does not contain a valid time. (The time unit of micro-fortnights is approximated as seconds in the implementation.) If the time specified by **TIMEPROMPTWAIT** elapses, the system continues the boot operation, and the date and time are set to the last recorded time that the system booted. For a VAX-11/730 processor, which does not have a battery backup clock, the system time must be supplied following a power failure.

System Parameters

C.2 Parameter Descriptions

Note

Digital recommends that you set the correct system time before allowing the system to run, so that all functions employing time-stamping (such as the operator log, the error log, accounting records, file creation dates, and file expiration dates) will contain correct time values.

Depending on the value specified for the TIMEPROMPTWAIT parameter, the system acts in one of the three following ways:

- If TIMEPROMPTWAIT is 0, no prompt or wait occurs; the system boots immediately, using the time of the last boot as the system time.
- If TIMEPROMPTWAIT is a positive number less than 32768, one prompt is issued and the value dictates how many seconds you can take to respond with a time. If you do not provide a time before TIMEPROMPTWAIT elapses, the system boots, using the time of the last boot as the system time.
- If TIMEPROMPTWAIT is a number in the range of 32768 through 65535, the prompt for the time is issued at intervals starting with 2 and doubling until 256 seconds is reached. If no response is received, the prompts restart, with the 2-second interval. This prompting process repeats indefinitely, until you specify a time.

TIMVCFAIL (D)

TIMVCFAIL specifies the time required for an adapter or virtual circuit failure to be detected. Digital recommends that the default value be used. Digital also recommends that this value be lowered only in VMSclusters of three CPUs or less, that the same value be used on each computer in the cluster, and that dedicated LAN segments be used for cluster I/O.

TMSCP_LOAD

TMSCP_LOAD allows the loading of the tape mass storage control protocol server software. The TMSCP_LOAD parameter also sets locally connected tapes served. Refer to *VMScluster Systems for OpenVMS* for information about setting the TMSCP_LOAD parameter.

When TMSCP_LOAD is set to 0, it inhibits the loading of the tape server and the serving of local tapes. When TMSCP is set to 1, it loads the tape server into memory at the time the system is booted, and makes all directly connected tape drives available clusterwide. The following table describes the two states of the TMSCP_LOAD parameter:

| State | Function |
|-------|--|
| 0 | Do not load the TMSCP tape server. Do not serve any local tape devices clusterwide. This is the default value. |
| 1 | Load the TMSCP tape server. Serve all local TMSCP tape devices clusterwide. |

TMSCP_SERVE_ALL

TMSCP_SERVE_ALL specifies TMSCP tape-serving functions when TMSCP server is loaded. If TMSCP_LOAD is set to 0, the TMSCP_SERVE_ALL parameter is ignored. Refer to *VMScluster Systems for OpenVMS* for information about setting the TMSCP_SERVE_ALL parameter.

The following table describes the parameter settings:

| State | Function |
|-------|--|
| 0 | Do not serve tapes. This is the default value. |
| 1 | Serve all available tapes. |
| 2 | Serve only locally connected tapes. |

TTY_ALTALARM

TTY_ALTALARM sets the size of the alternate type-ahead buffer alarm. This value indicates at what point an XOFF should be sent to terminals that use the alternate type-ahead buffers with the size specified by the TTY_ALTYPAHD parameter.

TTY_ALTYPAHD

TTY_ALTYPAHD sets the size of the alternate type-ahead buffer. Use this parameter to allow the block mode terminals and communications lines to operate more efficiently.

The default value is usually adequate. Do not exceed the maximum value of 32767 when setting this parameter.

TTY_AUTOCHAR (D)

TTY_AUTOCHAR sets the character the terminal driver echoes when the job controller has been notified.

TTY_BUF

TTY_BUF sets the default line width for terminals.

TTY_CLASSNAME

TTY_CLASSNAME provides the 2-character prefix for the terminal class driver name that is required when booting. Changing the prefix can be useful when debugging a new terminal driver.

TTY_DEFCHAR

TTY_DEFCHAR sets the default characteristics for terminals, using a code derived by summing the following hexadecimal values.

| Characteristic | Value (Hex) | Function |
|--------------------------|-------------|---------------------------------|
| PASSALL | 1 | Passall. |
| NOECHO | 2 | Noecho mode |
| NOTYPEAHEAD ¹ | 4 | No type-ahead buffer. |
| ESCAPE | 8 | Escape sequence processing. |
| HOSTSYNC | 10 | Host can send XON and XOFF. |
| TTSYNC | 20 | Terminal can send XON and XOFF. |
| SCRIPT | 40 | Internal use only. |
| LOWER | 80 | Lowercase. |
| MECHTAB | 100 | Mechanical tabs. |
| WRAP | 200 | Wraparound at end of line. |

¹Do not set this characteristic as the default in TTY_DEFCHAR.

System Parameters

C.2 Parameter Descriptions

| Characteristic | Value (Hex) | Function |
|---------------------|-------------|--------------------------------|
| CRFILL ¹ | 400 | Perform carriage return fill. |
| LFFILL ¹ | 800 | Perform line feed fill. |
| SCOPE | 1000 | Terminal is a scope. |
| REMOTE | 2000 | Internal use only. |
| EIGHTBIT | 8000 | Eight-bit terminal. |
| MBXDSABL | 10000 | Disable mailbox. |
| NOBRDCST | 20000 | Prohibit broadcast. |
| READSYNC | 40000 | XON and XOFF on reads. |
| MECHFORM | 80000 | Mechanical form feeds. |
| HALFDUP | 100000 | Set for half-duplex operation. |
| MODEM | 200000 | Set for modem signals. |
| PAGE | FF000000 | Page size. Default is 24. |

¹Do not set this characteristic as the default in TTY_DEFCHAR.

Where a condition is false, the value is 0.

The upper byte is the page length. The default characteristics are 24 lines per page, terminal synchronization, wraparound, lowercase, scope, and full-duplex.

TTY_DEFCHAR2

TTY_DEFCHAR2 sets a second longword of default terminal characteristics. The default characteristics are represented as a code that is derived by summing the following hexadecimal values:

| Characteristic | Value (Hex) | Function |
|----------------|-------------|---|
| LOCALECHO | 1 | Enable local echo terminal logic; use with the TTY_DEFCHAR NOECHO characteristic. |
| AUTOBAUD | 2 | Enable autobaud detection. |
| HANGUP | 4 | Hang up on logout. |
| MODHANGUP | 8 | Allow modification of HANGUP without privileges. |
| BRDCSTMBX | 10 | Allow sending of broadcasts to mailboxes. |
| XON | 20 | (No effect in this parameter.) |
| DMA | 40 | (No effect in this parameter.) |
| ALTYPEAHD | 80 | Use the alternate type-ahead parameters. |
| SETSPEED | 100 | Clear to allow setting of speed without privileges. |
| DCL_MAILBX | 200 | Function reserved to Digital. |
| DECCRT4 | 400 | Terminal is Digital CRT Level 4. |
| COMMSYNC | 800 | Enable flow control using modem signals. |
| EDITING | 1000 | Line editing allowed. |
| INSERT | 2000 | Sets default mode for insert. |

System Parameters

C.2 Parameter Descriptions

| Characteristic | Value (Hex) | Function |
|----------------|-------------|--|
| FALLBACK | 4000 | Do not set this bit with SYSGEN. Refer to the <i>OpenVMS Terminal Fallback Utility Manual</i> for information on setting the FALLBACK terminal characteristic using the Terminal Fallback utility. |
| DIALUP | 8000 | Terminal is a dialup line. |
| SECURE | 10000 | Guarantees that no process is connected to terminal after Break key is pressed. |
| DISCONNECT | 20000 | Allows terminal disconnect when a hangup occurs. |
| PASTHRU | 40000 | Terminal is in PASTHRU mode. |
| SYSPWD | 80000 | Log in with system password only. |
| SIXEL | 100000 | Sixel graphics. |
| DRCS | 200000 | Terminal supports loadable character fonts. |
| PRINTER | 400000 | Terminal has printer port. |
| APP_KEYPAD | 800000 | Notifies application programs of state to set keypad on exit. |
| ANSICRT | 1000000 | Terminal conforms to ANSI CRT programming standards. |
| REGIS | 2000000 | Terminal has REGIS CRT capabilities. |
| BLOCK | 4000000 | Block mode terminal. |
| AVO | 8000000 | Terminal has advanced video. |
| EDIT | 10000000 | Terminal has local edit capabilities. |
| DECCRT | 20000000 | Terminal is a Digital CRT. |
| DECCRT2 | 40000000 | Terminal is a Digital CRT Level 2. |
| DECCRT3 | 80000000 | Terminal is a Digital CRT Level 3. |

The defaults are AUTOBAUD and EDITING.

TTY_DEFPORT

TTY_DEFPORT provides flag bits for port drivers. Bit 0 set to 1 indicates that the terminal controller does not provide automatic XON/XOFF flow control. This bit should not be set for Digital controllers but is needed for some foreign controllers. Currently only the YCDRIVER (DMF32, DMZ32) uses this bit. The remaining bits are reserved for future use.

TTY_DIALTYPE

TTY_DIALTYPE provides flag bits for dialups. Bit 0 is 1 for United Kingdom dialups and 0 for all others. Bit 1 controls the modem protocol used. Bit 2 controls whether modem lines will hang up 30 seconds after seeing CARRIER if a channel is not assigned to the device. The remaining bits are reserved for future use. See the *OpenVMS I/O User's Reference Manual* for more information on flag bits.

TTY_DMASIZE (D)

TTY_DMASIZE specifies the number of characters in the output buffer below which character transfers are performed, and above which DMA transfers occur, provided the controller is capable of DMA I/O.

System Parameters

C.2 Parameter Descriptions

TTY_PARITY

TTY_PARITY sets terminal default parity.

TTY_RSPEED

TTY_RSPEED defines the receive speed for terminals. If TTY_RSPEED is 0, TTY_SPEED controls both the transmit and the receive speed. Maximum value is 17. This parameter is only applicable for controllers that support split-speed operations, such as the DZ32 and the DMF32.

TTY_SCANDELTA

TTY_SCANDELTA sets the interval for polling terminals for dialup and hangup events. Shorter intervals use more processor time; longer intervals may result in missing a hangup event.

TTY_SILOTIME

TTY_SILOTIME defines the interval at which the DMF32 hardware polls the input silo for received characters. The DMF32 asynchronous terminal controller can delay the generation of a single input interrupt until multiple characters have accumulated in the input silo. TTY_SILOTIME specifies the number of milliseconds that the characters are allowed to accumulate prior to the generation of an input interrupt by the hardware.

TTY_SPEED

TTY_SPEED sets the systemwide default speed for terminals. Low byte is transmit speed, and high byte is receive speed. If high byte is set to 0, receive speed is identical to transmit speed. Maximum value is 17. Baud rates are defined by the \$TTDEF macro.

TTY_TIMEOUT (D)

TTY_TIMEOUT sets the number of seconds before a process associated with a disconnected terminal is deleted. The default value (900 seconds) is usually adequate. Note that using values for TTY_TIMEOUT greater than one year (value %X01E13380) can cause overflow errors and result in a disconnected device timing out immediately.

TTY_TYPAHDSZ

TTY_TYPAHDSZ sets the size of the terminal type-ahead buffer. The default value is usually adequate. Do not exceed the maximum value of 32767 when setting this parameter.

UAFALTERNATE (D,G,M)

UAFALTERNATE enables or disables the assignment of SYSUAF as the logical name for SYSUAFALT, causing all references to the user authorization file (SYSUAF) to be translated to SYS\$SYSTEM:SYSUAFALT. Use of the normal user authorization file (SYS\$SYSTEM:SYSUAF) can be restored by deassigning the system logical name SYSUAF. This parameter should be set on (1) only when the system is being used by a restricted set of users. You must create a user authorization file named SYSUAFALT prior to setting UAFALTERNATE to 1.

UDABURSTRATE (G)

UDABURSTRATE is reserved to Digital.

USERD1 (D)

USERD1 is a dynamic parameter that is reserved for definition at the user's site. The reserved longword is referenced by the symbol SGN\$GL_USERD1.

Alpha

On Alpha systems, this symbol is in the SYS\$LOADABLE_IMAGES:SYS\$BASE_IMAGE module.♦

VAX

On VAX systems, the symbol is in the SYS\$SYSTEM:SYS.STB module.♦

USERD2 (D)

USERD2 is a dynamic parameter that is reserved for definition at the user's site. The reserved longword is referenced by the symbol SGN\$GL_USERD2.

Alpha

On Alpha systems, this symbol is in the SYS\$LOADABLE_IMAGES:SYS\$BASE_IMAGE module.♦

VAX

On VAX systems, the symbol is in the SYS\$SYSTEM:SYS.STB module.♦

USER3

USER3 is a parameter that is reserved for definition at the user's site. The reserved longword is referenced by the symbol SGN\$GL_USER3.

Alpha

On Alpha systems, this symbol is in the SYS\$LOADABLE_IMAGES:SYS\$BASE_IMAGE module.♦

VAX

On VAX systems, the symbol is in the SYS\$SYSTEM:SYS.STB module.♦

USER4

USER4 is a parameter that is reserved for definition at the user's site. The reserved longword is referenced by the symbol SGN\$GL_USER4.

Alpha

On Alpha systems, this symbol is in the SYS\$LOADABLE_IMAGES:SYS\$BASE_IMAGE module.♦

VAX

On VAX systems, the symbol is in the SYS\$SYSTEM:SYS.STB module.♦

VAXCLUSTER (A)

VAXCLUSTER controls loading of the cluster code. Specify one of the following:

| Value | Description |
|-------|-------------------------------------|
| 0 | Never load. |
| 1 | Load if SCSLOA is being loaded. |
| 2 | Always load (and also load SCSLOA). |

The default value is 1.

VAX

VCN_CACHE_S

On VAX systems, VCN_CACHE_S enables or disables virtual I/O caching. By default, virtual I/O caching is disabled. Change the value of the VCN_CACHE_S parameter in MODPARAMS.DAT as follows:

- VCN_CACHE_S = 1 to enable caching
- VCN_CACHE_S = 0 to disable caching

The virtual I/O cache is a clusterwide, file-oriented, disk cache that reduces I/O bottlenecks. The virtual I/O cache is transparent to system management and application software. This new feature maintains system reliability while it significantly improves virtual read performance.

System Parameters

C.2 Parameter Descriptions

The virtual I/O cache works on all supported configurations from single-node systems to large mixed-interconnect VAXcluster systems. Any OpenVMS system can support virtual I/O caching; a VAXcluster license is not required to use the caching functionality.

Note

If any member of a cluster does not have caching enabled, then no caching can occur on any node in the cluster (including the nodes that have caching enabled). This condition will remain until the node or nodes that have caching disabled either enable caching, or leave the cluster. ♦

VAX

VBSS_ENABLE

On VAX systems, enables virtual balance slots (VBS) to be created. A virtual balance slot holds the mapping for a memory-resident process that does not currently own a real balance slot (RBS). The set of real balance slots are timeshared among all memory-resident processes. With VBS enabled, the quantity of memory resident processes is limited by the system parameter MAXPROCESSCNT. With VBS disabled, the quantity of memory-resident processes is limited by the system parameter BALSETCNT.

When creating a new process, if the set of real balance slots is allocated, then a virtual balance slot is created and the owner of a real balance slot is selected and transitioned to the virtual balance slot. The new process is created in the real balance slot. Processes are transitioned (faulted) back to a real balance slot as they are scheduled to execute on a CPU. The following table indicates the result for each value:

| Bit | Result |
|-----|---|
| 0 | Enables VBS. All other VBS enables are subordinate to this enable. The default is disabled. |
| 1 | Enables the creation of a map for process-based direct I/O, allowing the process with direct I/O (DIO) outstanding to be transitioned to a virtual balance slot. Without DIO maps, a process with DIO outstanding retains its real balance slot for the duration of the DIO. This reduces the pool of available real balance slots for timesharing, which may result in a higher rate of faulting into the limited set of real balance slots. The default is enabled. |
| 2-7 | Reserved to Digital for future use. ♦ |

VAX

VBSS_ENABLE2

On VAX systems, this cell is for used enabling and disabling VBS dynamic capabilities and are only valid when VBS is enabled. The following table indicates the result for each value:

| Bit | Result |
|-----|--|
| 0 | Enables VBS to perform first-level data reduction when switching processes. The default is enabled. |
| 1 | Enables VBS to perform second-level data reduction when switching processes. The default is enabled. |

| Bit | Result |
|-----|--|
| 2 | Requests VBS to perform an optimization that will detect empty private page table pages on the modified list and free them directly to the free list versus writing them to the page file. The default setting is enabled. |
| 3-7 | Reserved to Digital for future use. ♦ |

Alpha

VCC_FLAGS

On Alpha systems, VCC_FLAGS enables or disables virtual I/O caching. The virtual I/O cache is a file-oriented disk cache that reduces I/O bottlenecks and improves performance. Cache operation is transparent to application software and requires very little system management. This new functionality provides a write-through cache that maintains the integrity of disk writes while significantly improving read performance. The virtual I/O cache works on standalone systems and in a VMSccluster environment provided that all nodes in the VMSccluster support virtual I/O caching.

By default, virtual I/O caching is enabled. Change the value of the VCC_FLAGS parameter as follows:

- VCC_FLAGS = 1 to enable caching
- VCC_FLAGS = 0 to disable caching

By default, memory is allocated for caching 6400 disk blocks. This requires 3.2 Mbyte of memory. Use the system parameter VCC_MAXSIZE to control memory allocation in units of disk blocks. ♦

Alpha

VCC_FLAGS_D

On Alpha systems, VCC_FLAGS_D is reserved to Digital.

Alpha

VCC_FLAGS_S

On Alpha systems, VCC_FLAGS_S is reserved to Digital.

Alpha

VCC_MAXSIZE

On Alpha systems, VCC_MAXSIZE controls memory allocation virtual I/O cache in units of disk blocks. ♦

Alpha

VCC_MINSIZE

On Alpha systems, VCC_MINSIZE is the minimum size of virtual I/O cache, in units of disk blocks. ♦

VAX

VCC_PTES

On VAX Systems, VCC_PTES specifies the MAXIMUM size that the virtual I/O cache is permitted to dynamically expand. VCC_PTES is a static parameter and requires that the system reboot after being changed by the AUTOGEN mechanism. ♦

VECTOR_MARGIN (D)

VECTOR_MARGIN establishes the time interval when the system checks the status of all vector consumers. The VECTOR_MARGIN parameter accepts an integer value between 1 and FFFFFFFF₁₆. This value represents a number of consecutive process quanta (as determined by the system parameter QUANTUM). If the process has not issued any vector instructions in the specified number of quanta, the system declares it a marginal vector consumer.

The default value of the VECTOR_MARGIN parameter is 200₁₀.

System Parameters

C.2 Parameter Descriptions

VECTOR_PROC

VECTOR_PROC controls loading of vector processing support code. By default, in a VAX vector processing system, the system automatically loads the vector processing support code at boot time. You can override the default behavior by setting the static system parameter VECTOR_PROC to one of the following values:

| Value | Result |
|-------|---|
| 0 | Do not load the vector processing support code, regardless of the system configuration. |
| 1 | Load the vector processing support code if at least one vector-present processor exists. This is the default value. |
| 2 | Load the vector processing support code if the system is vector-capable. This setting is most useful for a system in which processors have separate power supplies. With this setting, you can reconfigure a vector processor into the system without rebooting the operating system. |
| 3 | Always load the vector processing support code. |

VIRTUALPAGECNT (A,G,M)

VIRTUALPAGECNT sets the maximum number of virtual pages that can be mapped for any one process.

A program is allowed to divide its virtual space between the P0 and P1 tables in any proportion. When the System Dump Analyzer is used, you must ensure that the value of VIRTUALPAGECNT is at least the size of the dump file plus approximately 5300 pages.

If you use SYS\$UPDATE:LIBDECOMP.COM to decompress libraries and the VIRTUALPAGECNT setting is low, make sure to set the PGFLQUOTA field in the user authorization file to at least twice the size of the library.

At installation time, AUTOGEN automatically sets an appropriate value for this parameter. The value depends on the particular configuration—the type and number of graphics adapters on the system. You will not be able to set VIRTUALPAGECNT to any value below the minimum required for your graphics configuration.

If you change the type or number of graphics adapters included in your workstation, rerun AUTOGEN to reset the VIRTUALPAGECNT parameter accordingly.

Since the VIRTUALPAGECNT setting is used to support hardware address space rather than system memory, the value of VIRTUALPAGECNT set by AUTOGEN should not be used to gauge the size of your page file.

VOTES (A)

VOTES establishes the number of votes a VMScluster member system contributes to a quorum.

WINDOW_SYSTEM (D)

WINDOW_SYSTEM specifies the windowing system to be used on a workstation. Specify one of the following values:

| Value | Description |
|-------|---|
| 1 | Load the DECwindows Motif for OpenVMS workstation environment. |
| 2 | Load the UIS workstation environment. This is the default windowing system established on VAX workstations. |

VAX

WPRE_SIZE

On VAX systems, WPRE_SIZE represents the number of pages to be allocated to accommodate WatchPoint Recovery Entries (WPRE) on the Watchpoint Driver. ♦

VAX

WPTTE_SIZE

On VAX systems, WPTTE_SIZE is the number of entries that the WPDRIVER creates in the WatchPoint Trace Table. ♦

VAX

WSDEC (A,D,M)

On VAX systems, WSDEC specifies the number of pages by which the limit of a working set is automatically decreased at each adjustment interval (which is quantum end). At a setting of 35, for example, the system will decrease the limit of a working set by 35 pages each time a decrease is required. ♦

Alpha

On Alpha systems, WSDEC specifies the number of pagelets by which the limit of a working set is automatically decreased at each adjustment interval (which is quantum end). At a setting of 35, for example, the system will decrease the limit of a working set by 35 pagelets each time a decrease is required. ♦

Increasing the value of this parameter tends to increase the speed with which working set limits are decreased when the need arises.

VAX

WSINC (A,D,M)

On VAX systems, WSINC specifies the number of pages by which the limit of a working set is automatically increased at each adjustment interval (which is quantum end). At a setting of 150, for example, the system will increase the limit of a working set by 150 pages each time an increase is required. On VAX systems, the default value is 150 512-byte pages. ♦

Alpha

On Alpha systems, WSINC specifies the number of pagelets by which the limit of a working set is automatically increased at each adjustment interval (which is quantum end). At a setting of 150, for example, the system will increase the limit of a working set by 150 pagelets each time an increase is required. On Alpha systems, the default value is 2400 512-byte pagelets (150 8192-byte Alpha pages). ♦

Decreasing the value of this parameter tends to reduce the speed with which working set limits are increased when the need arises. Normally, you should keep this parameter at a high value because a rapid increase in limit is often critical to performance.

A value of 0 for WSINC disables the automatic adjustment of working set limits for all processes. Limits stay at their base values. You can disable the automatic adjustment of working set limits on a per-process basis by using the DCL command SET WORKING_SET.

WSMAX (A,G,M)

WSMAX sets the maximum number of pages on a systemwide basis for any working set.

System Parameters

C.2 Parameter Descriptions

WS_OPA0

WS_OPA0 enables OPA0 output to the QVSS screen for a workstation. A value of 1 enables output for OPA0 to the QVSS screen; a value of 0 causes output for OPA0 to be ignored.

XFMAXRATE (D)

XFMAXRATE limits the data transfer rate that can be set for DR32 devices. On some hardware configurations (especially those without interleaved memory), a high DR32 transfer rate could cause a machine check (CPU timeout). The *OpenVMS I/O User's Reference Manual* describes how to encode this parameter.

Alpha

ZERO_LIST_HI (A,D)

On Alpha systems, ZERO_LIST_HI is the maximum number of pages zeroed and put on the zeroed page list. This list is used as a cache of pages containing all zeros, which improves the performance of allocating such pages. ♦

C.2.2 Special System Parameters

These parameters are subject to change at any time and should be modified only if recommended by Digital.

AFFINITY_SKIP

AFFINITY_SKIP controls the breaking of implicit affinity. The value indicates the number of times a process is skipped before being moved.

AFFINITY_TIME

AFFINITY_TIME controls the breaking of implicit affinity. The value indicates how long a process remains on the compute queue.

VAX

BREAKPOINTS

On VAX systems, if XDELTA is loaded, BREAKPOINTS enables additional built-in calls for XDELTA during the boot sequence. The breakpoints that are enabled may change from release to release of OpenVMS. ♦

CHANNELCNT

CHANNELCNT specifies the number of permanent I/O channels available to the system.

VAX

CLOCK_INTERVAL

On VAX systems, CLOCK_INTERVAL sets the number of microseconds between the hardware interval timer clock interrupts. It has no effect on processors that have implemented only the subset interval clock registers. ♦

CONCEAL_DEVICES

CONCEAL_DEVICES enables or disables the use of concealed devices. By default, this parameter is set to enable concealed devices (1).

CTLIMGLIM

CTLIMGLIM specifies the size of the default image I/O segment; that is channel table and initial buffer pool for image-related file and RMS I/O.

CTLPAGES

CTLPAGES specifies the size of P1 pool. CTLPAGES is changed only when the process logical name table, DCL symbols, or some layered products, such as UIS, require an increase in the size of the P1 pool area.

DLCEXTRASTK

DLCEXTRASTK specifies the amount of extra interrupt stack (in bytes) to leave when doing a deadlock search.

VAX

DNVOSI1

On VAX systems, DNVOSI1 is reserved to DECnet/OSI for OpenVMS. ♦

EXUSRSTK

EXUSRSTK specifies the amount of space provided by the image activator to recover from a stack overflow error.

IMGIOCNT

IMGIOCNT specifies the default number of pages of image I/O address space to be allocated for the image activator if not specified at program link time.

IOTA

IOTA specifies the amount of time (in 10-millisecond units) to charge to the current residence quantum for each voluntary wait. The correct value approximates the cost of a disk I/O neglecting wait time.

LOCKRETRY

LOCKRETRY establishes the number of attempts made to lock a multiprocessor data structure.

VAX

MAXCLASSPRI

On VAX systems, if class scheduling is enabled, MAXCLASSPRI sets the minimum range in the priority range of class-scheduled processes. ♦

VAX

MINCLASSPRI

On VAX systems, if class scheduling is enabled, MINCLASSPRI sets the minimum range in the priority range of class-scheduled processes. ♦

MPW_PRIO

MPW_PRIO sets the priority of I/O transfers initiated by the modified page writer. The maximum value is 31, the minimum is 0, and the default is 4.

NOAUTOCONFIG (D)

NOAUTOCONFIG controls whether all devices are automatically configured when the system boots. The default value of 0 sets the system to automatically configure all devices. NOAUTOCONFIG should only be set to 1 (no automatic configuration) for debugging purposes.

NOCLUSTER

NOCLUSTER controls whether page read clustering is inhibited when the system boots. NOCLUSTER should only be set to 1 (inhibit page read clustering) for debugging purposes.

NOPGSWP

If enabled, NOPGFLSWP disables swapping into page files.

PAGTBLPFC

PAGTBLPFC specifies (in pages) the maximum number of page tables to read to satisfy a fault for a nonresident page table.

System Parameters

C.2 Parameter Descriptions

PE

PE1, PE2, PE3, PE4, PE5, PE6 are reserved to Digital. These parameters are for cluster algorithms and their usages can change from release to release. Digital recommends using the default values.

Alpha

PFN_COLOR_COUNT

On Alpha systems, PFN_COLOR_COUNT specifies the number of buckets (colors) into which all members of the zeroed page list and all unencumbered members of the free page list are sorted. OpenVMS Alpha systems may derive a preferred page color from a request to map a given virtual page and attempt to map that virtual page to a PFN of matching "color". This results in less variance in which cache blocks may be used when accessing that page. This may or may not improve performance, depending upon the application. Note that when you increase this parameter, you should also increase the ZERO_LIST_HI parameter. ♦

VAX

PFRATS

On VAX systems, PFRATS specifies the page fault rate threshold for the system. ♦

Alpha

PHYSICAL_MEMORY

On Alpha systems, PHYSICAL_MEMORY specifies the amount of physical memory available for use. The default setting is -1. If you want to reduce the amount of memory available, for example, if memory dumps take a long time, consider reducing the amount of memory specified by PHYSICAL_MEMORY. (You can also get partial dumps by setting the system parameter DUMPSTYLE to 1.) ♦

VAX

PHYSICALPAGES (A)

On VAX systems, PHYSICALPAGES sets the maximum number of physical pages of memory to be used on the system. Decreasing this parameter allows you to test smaller configurations of memory without the need to remove memory boards. ♦

PIOPAGES

PIOPAGES specifies the size of the process I/O segment, that is, channel table and buffer pool for process permanent file/RMS I/O. The default value is 336 pages.

PIXSCAN (D)

PIXSCAN specifies the number of process index slots scanned each second for computable or computable-outswapped processes. These processes receive an automatic priority boost for 1 quantum, unless the priority of the currently executing process is greater than 15. The priority boost is done to avoid potential deadlocks on the system.

POOLCHECK (D)

POOLCHECK is used to investigate frequent and inexplicable failures in a system. When POOLCHECK is enabled, pool-checking routines execute whenever pool is deallocated or allocated.

Two loadable forms of SYSTEM_PRIMITIVES.EXE are available at boot time. The default image, which contains no pool-checking code and no statistics maintenance, is loaded when POOLCHECK is set to zero. When POOLCHECK is set to a nonzero value the monitoring version of SYSTEM_PRIMITIVES.EXE, which contains both pool-checking code and statistics maintenance, will be loaded.

For further information on pool checking, refer to the *OpenVMS VAX Device Support Manual*.

POOLPAGING

POOLPAGING enables (1) paging of pageable dynamic pool.

VAX

PSEUDOLOA

On VAX systems, PSEUDOLOA specifies (in pages) the size of the PDA0 system image. This parameter is used to boot standalone BACKUP from magnetic tape. ♦

VAX

QBUS_MULT_INTR

On VAX systems, QBUS_MULT_INTR enables (1) multilevel interrupt dispatching on systems that use the Q22-bus adapter. Refer to the *OpenVMS VAX Device Support Manual* for more information about the QBUS_MULT_INTR system parameter. ♦

RESALLOC

RESALLOC controls whether resource allocation checking is performed. The default value of 0 disables resource allocation checking.

RSRVPAGCNT

RSRVPAGCNT sets the number of pages that are reserved and escrowed for the current process page file.

S0_PAGING

S0_PAGING enables (1) paging of system code.

SA_APP

SA_APP is reserved to Digital.

VAX

SBIERRENABLE

On VAX systems, SBIERRENABLE enables (1) SBI error detection and logging. ♦

VAX

SCSI_NOAUTO (D)

On VAX systems, SCSI_NOAUTO prevents the loading of a disk or tape SCSI class driver for any given device ID in a configuration that includes an SCSI third-party device. The SCSI_NOAUTO system parameter stores a bit mask of 32 bits, where the low-order byte corresponds to the first SCSI bus (PKA0), the second byte corresponds to the second SCSI bus (PKB0), and so on, as follows:

| | | | | | | | |
|---------------------------|----|----|----|----|---|---|---|
| #31 | 24 | 23 | 16 | 15 | 8 | 7 | 0 |
| +-----+-----+-----+-----+ | | | | | | | |
| | D | | C | | B | | A |
| +-----+-----+-----+-----+ | | | | | | | |

For each SCSI bus, setting the low-order bit inhibits automatic configuration of the device with SCSI device ID 0; setting the second low-order bit inhibits automatic configuration of the device with SCSI device ID 1, and so forth. For instance, the value 00002000₁₆ would prevent the device with SCSI ID 5 on the bus identified by SCSI port ID B from being configured. By default, all of the bits in the mask are cleared, allowing all devices to be configured. ♦

SMP_CPUSH

SMP_CPUSH is reserved to Digital. Digital recommends using the default value.

System Parameters

C.2 Parameter Descriptions

SMP_TICK_CNT

SMP_TICK_CNT sets the frequency of sanity timer checks by each CPU in a multiprocessing system.

SSINHIBIT

SSINHIBIT controls whether system services are inhibited (1) (on a per-process basis). By default, system services are not inhibited (0).

SWPALLOCINC

SWPALLOCINC sets the size (in blocks) to use to back up swap file space allocation in the swap or page file. Space in the file will be allocated multiples of this unit (up to WSQUOTA) to guarantee swap space.

SWPFAIL

SWPFAIL sets the number of consecutive swap failures allowed before the swap schedule algorithm is changed to ignore the swap quantum protection.

SWPRATE

SWPRATE sets the swapping rate (in 10-millisecond units). This parameter limits the amount of disk bandwidth consumed by swapping.

SWP_PRIO

SWP_PRIO sets the priority of I/O transfers initiated by the swapper.

SYSPFC

SYSPFC sets the number of pages to be read from disk on each system paging operation.

TBSKIPWSL

TBSKIPWSL specifies the maximum number of working set list entries that may be skipped while scanning for a "good" entry to discard. Set this parameter to 0 to disable skipping.

VMS (D)

VMUSD1, VMUSD2, VMUSD3, VMUSD4, VMS5, VMS6, VMS7, and VMS8 are parameters reserved for Digital use. VMUSD1 through VMUSD4 are dynamic.

WRITABLESYS

WRITABLESYS controls whether system code is writable. This parameter is set (value of 1) for debugging purposes only.

VAX

WRITESYSPARAMS (D)

On VAX systems, WRITESYSPARAMS indicates that parameters are modified during SYSBOOT and are written out to VAXVMSSYS.PAR by STARTUP.COM. ♦

Alpha

On Alpha systems, WRITESYSPARAMS indicates that parameters are modified during SYSBOOT and are written out to ALPHAVMSSYS.PAR by STARTUP.COM. ♦

XQPCTL2

XQPCTL2 controls improved concurrency. The default value of XQPCTL2 is 0, which turns off improved concurrency. To turn on improved concurrency, set XQPCTL2 to 1.

XQPCTLD1

XQPCTLD1 controls multi-threading, which can only be used by PATHWORKS servers. The default value of XQPCTLD1 is 0, which disables multi-threading. To enable multi-threading, set XQPCTLD1 to 8.

Configuring Devices with SYSGEN (VAX Only)

Digital-supplied devices are attached to the UNIBUS or Q22-bus adapters according to the following basic rules:

- A device of type A is always at a fixed and predefined CSR address; the device always interrupts at a fixed and predefined vector address; only one example of device A can be configured in each system.
- A device of type B is identical to type A except that 1 through n examples can be configured in a single system. Examples 2 through n are also located at fixed and predefined CSRs and vector addresses.
- Devices of type C (1 through n of them) are always at fixed and predefined CSR addresses; however, the interrupt vector addresses vary according to what other devices are present on the system.
- Devices of type D (1 through n of them) are at CSR addresses and vector addresses that vary according to what other devices are present on the system.

CSR and vector addresses that vary are called **floating addresses**. The devices must be located in floating CSR and vector space according to the order in which the devices appear in the SYSGEN device table. (See Table D-1.) The SYSGEN device table lists all the type A and type B devices supported by the operating system. It also lists the type C and type D devices that are recognized by SYSGEN's autoconfiguration procedure.

The base of floating vector space is 300_8 . The base of floating CSR space is 760010_8 .

D.1 SYSGEN Device Table (VAX Only)

The SYSGEN device table lists the characteristics of all Digital devices. This table indicates the following information for each device type:

- Device name
- Device controller name
- Interrupt vector
- Number of interrupt vectors per controller
- Vector alignment factor
- Address of the first device register for each controller recognized by SYSGEN (the first register is usually, but not always, the CSR)
- Number of registers per controller
- Device driver name
- Indication of whether the driver is supported

Configuring Devices with SYSGEN (VAX Only)

D.1 SYSGEN Device Table (VAX Only)

Devices not listed in the SYSGEN device table include:

- Those devices not supplied by Digital with fixed CSR and vector addresses. These devices have no effect on autoconfiguration. Customer-built devices should be assigned CSR and vector addresses beyond the floating address space reserved for Digital-supplied devices.
- Those Digital-supplied floating-vector devices that the AUTOCONFIGURE command does not recognize. Use the CONNECT command to attach these devices to the system.

Table D-1 SYSGEN Device Table (VAX Only)

| Device Name | Controller Name | Vector | Number of Vectors | Vector Alignment | CSR/Rank | Register Alignment | Driver Name | Support |
|-------------|-----------------|--------|-------------------|------------------|----------|--------------------|-------------|---------|
| CR | CR11 | 230 | 1 | — | 777160 | — | CRDRIVER | Yes |
| DM | RK611 | 210 | 1 | — | 777440 | — | DMDRIVER | Yes |
| LP | LP11 | 200 | — | — | 777514 | — | LPDRIVER | Yes |
| | | 170 | | | 764004 | | | |
| | | 174 | | | 764014 | | | |
| | | 270 | | | 764024 | | | |
| | | 274 | | | 764034 | | | |
| DL | RL11 | 160 | 1 | — | 774400 | — | DLDRIVER | Yes |
| MS | TS11 | 224 | 1 | — | 772520 | — | TSDRIVER | Yes |
| DY | RX211 | 264 | 1 | — | 777170 | — | DYDRIVER | Yes |
| DQ | RB730 | 250 | 1 | — | 775606 | — | DQDRIVER | Yes |
| PU | UDA | 154 | 1 | — | 772150 | — | PUDRIVER | Yes |
| PT | TU81 | 260 | 1 | — | 774500 | — | PUDRIVER | Yes |
| XE | UNA | 120 | 1 | — | 774510 | — | XEDRIVER | Yes |
| XQ | QNA | 120 | 1 | — | 774440 | — | XQDRIVER | Yes |
| OM | DC11 | Float | 2 | 8 | 774000 | — | OMDRIVER | No |
| | | | | | 774010 | | | |
| | | | | | 774020 | | | |
| | | | | | 774030 | | | |
| | | | | | . | | | |
| | | | | | . | | | |
| | | | | | 32 units | | | |
| | | | | | maximum | | | |
| DD | TU58 | Float | 2 | 8 | 776500 | — | DDRIVER | Yes |
| | | | | | 776510 | | | |
| | | | | | 776520 | | | |
| | | | | | 776530 | | | |
| | | | | | . | | | |
| | | | | | . | | | |
| | | | | | 16 units | | | |
| | | | | | maximum | | | |

(continued on next page)

Configuring Devices with SYSGEN (VAX Only)

D.1 SYSGEN Device Table (VAX Only)

Table D-1 (Cont.) SYSGEN Device Table (VAX Only)

| Device Name | Controller Name | Vector | Number of Vectors | Vector Alignment | CSR/Rank | Register Alignment | Driver Name | Support |
|-------------|-----------------|--------|-------------------|------------------|--|--------------------|-------------|---------|
| OB | DN11 | Float | 1 | 4 | 775200 775210 775220 775230 . . 16 units maximum | — | OBDriver | No |
| YM | DM11B | Float | 1 | 4 | 770500 770510 770520 770530 . . 16 units maximum | — | YMDriver | No |
| OA | DR11C | Float | 2 | 8 | 767600 767570 767560 767550 . . 16 units maximum | — | OADriver | No |
| PR | PR611 | Float | 1 | 8 | 772600 772604 772610 772614 . . 8 units maximum | — | PRDriver | No |
| PP | PP611 | Float | 1 | 8 | 772700 772704 772710 772714 . . 8 units maximum | — | PPDriver | No |
| OC | DT11 | Float | 2 | 8 | 777420 777422 777424 777426 . . 8 units maximum | — | OCDriver | No |
| OD | DX11 | Float | 2 | 8 | 776200 776240 | — | ODDriver | No |

(continued on next page)

Configuring Devices with SYSGEN (VAX Only)

D.1 SYSGEN Device Table (VAX Only)

Table D-1 (Cont.) SYSGEN Device Table (VAX Only)

| Device Name | Controller Name | Vector | Number of Vectors | Vector Alignment | CSR/Rank | Register Alignment | Driver Name | Support |
|-------------|-----------------|--------|-------------------|------------------|--|--------------------|-------------|---------|
| YL | DL11C | Float | 2 | 8 | 775610 775620 775630 775640 . . 31 units maximum | — | YLDriver | No |
| YJ | DJ11 | Float | 2 | 8 | Float | 8 | YJDriver | No |
| YH | DH11 | Float | 2 | 8 | Float | 16 | YHDriver | No |
| OE | GT40 | Float | 4 | 8 | 772000 772010 | — | OEDriver | No |
| LS | LPS11 | Float | 6 | 8 | 770400 | — | LSDriver | No |
| OR | DQ11 | Float | 2 | 8 | Float | 8 | ORDriver | No |
| OF | KW11W | Float | 2 | 8 | 772400 | — | OFDriver | No |
| XU | DU11 | Float | 2 | 8 | Float | 8 | XUDriver | No |
| XV | DV11 | Float | 3 | 8 | 775000 775040 775100 775140 | — | XVDriver | No |
| OG | LK11 | Float | 2 | 8 | Float | 8 | OGDriver | No |
| XM | DMC11 | Float | 2 | 8 | Float | 8 | XMDriver | Yes |
| TTA | DZ11 | Float | 2 | 8 | Float | 8 | DZDriver | Yes |
| XK | KMC11 | Float | 2 | 8 | Float | 8 | XKDriver | No |
| OH | LPP11 | Float | 2 | 8 | Float | 8 | OHDriver | No |
| OI | VMV21 | Float | 2 | 8 | Float | 8 | OIDriver | No |
| OJ | VMV31 | Float | 2 | 8 | Float | 16 | OJDriver | No |
| OK | DWR70 | Float | 2 | 8 | Float | 8 | OKDriver | No |
| DL | RL11 | Float | 1 | 4 | Float | 8 | DLDriver | Yes |
| MS | TS11 | Float | 1 | 4 | 772524 772530 772534 | — | TSDriver | Yes |
| LA | LPA11 | Float | 2 | 8 | 770460 | — | LADriver | Yes |
| LA | LPA11 | Float | 2 | 8 | Float | 16 | LADriver | Yes |
| OL | KW11C | Float | 2 | 8 | Float | 8 | OLDriver | No |
| DY | RX211 | Float | 1 | 4 | Float | 8 | DYDriver | Yes |
| XA | DR11W | Float | 1 | 4 | Float | 8 | XADriver | Yes |
| XB | DR11B | 124 | — | — | 772410 | — | XBDriver | No |
| XB | DR11B | Float | 1 | 4 | 772430 | — | XBDriver | No |
| XB | DR11B | Float | 1 | 4 | Float | 8 | XBDriver | No |
| XD | DMP11 | Float | 2 | 8 | Float | 8 | XDDriver | Yes |

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Configuring Devices with SYSGEN (VAX Only)

D.1 SYSGEN Device Table (VAX Only)

Table D-1 (Cont.) SYSGEN Device Table (VAX Only)

| Device Name | Controller Name | Vector | Number of Vectors | Vector Alignment | CSR/Rank | Register Alignment | Driver Name | Support |
|-------------|-----------------|--------|-------------------|------------------|--------------------------------------|--------------------|-------------|---------|
| ON | DPV11 | Float | 2 | 8 | Float | 8 | ONDRIVER | No |
| IS | ISB11 | Float | 2 | 8 | Float | 8 | ISDRIVER | No |
| XD | DMV11 | Float | 2 | 8 | Float | 16 | XDDRIVER | No |
| XE | UNA | Float | 1 | 4 | Float | 8 | XEDRIVER | No |
| XQ | QNA | Float | 1 | 4 | 774460 | — | XQDRIVER | Yes |
| PU | UDA | Float | 1 | 4 | Float | 4 | PUDRIVER | Yes |
| XS | KMS11 | Float | 3 | 8 | Float | 16 | XSDRIVER | No |
| XP | PCL11 | Float | 2 | 8 | 764200 764240 764300 764340 | — | XPDRIVER | No |
| VB | VS100 | Float | 1 | 4 | Float | 16 | VBDRIVER | No |
| PT | TU81 | Float | 1 | 4 | Float | 4 | PUDRIVER | Yes |
| OQ | KMV11 | Float | 2 | 8 | Float | 16 | OQDRIVER | No |
| UK | KCT32 | Float | 2 | 8 | 764400 764440 764500 764540 | — | UKDRIVER | No |
| IX | IEQ11 | Float | 2 | 8 | 764100 | — | IXDRIVER | No |
| TX | DHV11 | Float | 2 | 8 | Float | 16 | YFDRIVER | Yes |
| DT | TC11 | 214 | 1 | — | 777340 | — | DTDRIVER | No |
| VC | VCB01 | Float | 2 | 1 | 777200 | — | VCDRIVER | Yes |
| VC | VCB01 | Float | 2 | 1 | Float | 64 | VCDRIVER | Yes |
| OT | LVN11 | Float | 1 | 4 | 776200 | — | OTDRIVER | No |
| LD | LVN21 | Float | 1 | 4 | Float | 16 | LDDRIVER | No |
| ZQ | QTA | Float | 1 | 4 | 772570 | — | ZQDRIVER | No |
| ZQ | QTA | Float | 1 | 4 | Float | 8 | ZQDRIVER | No |
| SJ | DSV11 | Float | 1 | 4 | Float | 8 | SJDRIVER | No |
| OU | ADV11C | Float | 2 | 8 | Float | 8 | OUDRIVER | No |
| OV | AAV11 | Float | 0 | 8 | 770440 | — | OVDRIVER | No |
| OV | AAV11C | Float | 0 | 8 | Float | 8 | OVDRIVER | No |
| AX | AXV11C | 140 | 2 | — | 776400 | — | AXDRIVER | No |
| AX | AXV11C | Float | 2 | 8 | Float | 8 | AXDRIVER | No |
| KZ | KWV11C | Float | 2 | 8 | 770420 | — | KZDRIVER | No |
| KZ | KWV11C | Float | 2 | 8 | Float | 4 | KZDRIVER | No |
| AZ | ADV11D | Float | 2 | 8 | 776410 | — | AZDRIVER | No |
| AZ | ADV11D | Float | 2 | 8 | Float | 4 | AZDRIVER | No |
| AY | AAV11D | Float | 2 | 8 | 776420 | — | AYDRIVER | No |
| AY | AAV11D | Float | 2 | 8 | Float | 4 | AYDRIVER | No |

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Configuring Devices with SYSGEN (VAX Only)

D.1 SYSGEN Device Table (VAX Only)

Table D-1 (Cont.) SYSGEN Device Table (VAX Only)

| Device Name | Controller Name | Vector | Number of Vectors | Vector Alignment | CSR/Rank | Register Alignment | Driver Name | Support |
|-------------|-----------------|--------|-------------------|------------------|---|--------------------|-------------|---------|
| VA | VCB02 | Float | 3 | 16 | 777400 777402 777404 777406 . . 8 units maximum | — | VADriver | Yes |
| DN | DRV11J | Float | 16 | 4 | 764160 764140 764120 | — | DNDriver | No |
| HX | DRQ3B | Float | 2 | 8 | Float | 16 | HXDriver | No |
| VQ | VSV24 | Float | 1 | 4 | Float | 8 | VQDriver | No |
| VV | VSV21 | Float | 1 | 4 | Float | 8 | VVDriver | No |
| BQ | IBQ01 | Float | 1 | 4 | Float | 8 | BQDriver | No |
| UT | MIRA | Float | 2 | 8 | Float | 8 | UTDriver | No |
| IX | IEQ11 | Float | 2 | 8 | Float | 16 | IXDriver | No |
| AW | ADQ32 | Float | 2 | 8 | Float | 32 | AWDriver | No |
| VX | DTC04 | Float | 2 | 8 | Float | 2 | VXDriver | No |
| CQ | DESNA | Float | 1 | 4 | Float | 32 | CQDriver | No |
| GQ | IGQ11 | Float | 2 | 8 | Float | 4 | GQDriver | No |

D.2 Configuring VAXstation 2000 and MicroVAX 2000 Devices (VAX Only)

The System Generation utility (SYSGEN) connects devices, loads their drivers, creates the data structures by which the operating system and drivers coordinate their activities, and calls device initialization routines. In general, SYSGEN is invoked for these purposes late in system initialization during the execution of the system startup command procedure, SYS\$SYSTEM:STARTUP.COM.

Configuring Devices with SYSGEN (VAX Only)

D.2 Configuring VAXstation 2000 and MicroVAX 2000 Devices (VAX Only)

At that time, STARTUP.COM issues a SYSGEN AUTOCONFIGURE ALL command. SYSGEN's Autoconfigure facility examines its table of possible VAXstation 2000 and MicroVAX 2000 devices (see Table D-2), determines which devices are attached to the system, and configures existing devices using information in the table.

Digital strongly recommends that you accept the default behavior of STARTUP.COM. If you must exclude a specific device from being configured, you must first prevent STARTUP.COM from performing the autoconfiguration by setting the SYSBOOT parameter NOAUTOCONFIG. After invoking SYSGEN, you should ensure that the base asynchronous serial ports are always autoconfigured. To do this, enter the following command:

```
SYSGEN> AUTOCONFIGURE ALL/SELECT=TT:
```

You can also enter an AUTOCONFIGURE ALL/EXCLUDE=(device-name[,...]) command, making sure not to exclude the serial lines. Subsequent CONNECT statements should be written with the appropriate csr_addr value to the command's /CSR qualifier, as shown in Table D-2. These csr_addr values are actually offsets from the beginning of VAXstation 2000 and MicroVAX 2000 I/O space (EXE\$GL_CPUNODSP), thus differing from the customary bus address value traditionally specified for UNIBUS devices in the CONNECT command.

Table D-2 VAXstation 2000 Autoconfiguration Table (VAX Only)

| Device | Name | Driver | CSR | Number of Vectors | First Vector | Vector Offset |
|------------------------------|------|----------|--------|-------------------|--------------|---------------|
| Standard Serial Lines | TT | YEDRIVER | ^X0800 | 2 | ^O300 | 4 |
| ST506 Disk Controller | DU | DVDRIVER | ^X0C00 | 1 | ^O774 | — |
| TK50 Tape Controller | MU | TVDRIVER | ^X0C80 | 1 | ^O770 | — |
| Ethernet Controller | ES | ESDRIVER | ^X4E00 | 1 | ^O120 | — |
| MicroVAX 2000 Serial Lines | YF | YFDRIVER | ^X6800 | 2 | ^O104 | 4 |
| 32-Channel Synchronous Lines | ZS | ZSDRIVER | ^X6800 | 1 | ^O110 | — |
| Color Video Option | VA | VFDRIVER | ^X6A00 | 2 | ^O104 | 4 |
| Black & White Video Option | VC | VEDRIVER | ^X5000 | 1 | ^O104 | — |

Examples of correct CONNECT commands for VAXstation 2000 and MicroVAX 2000 devices include the following:

```
CONNECT ESA0 /ADAP=0 /CSR=%X4E00 /VECT=%O120 /NUMV=01 /DRIVER=ESDRIVER
CONNECT MUA0 /ADAP=0 /CSR=%X0C80 /VECT=%O770 /NUMV=01 /DRIVER=TVDRIVER
CONNECT DUA0 /ADAP=0 /CSR=%X0C00 /VECT=%O774 /NUMV=01 /DRIVER=DVDRIVER
CONNECT DUA1 /ADAP=0 /CSR=%X0C00 /VECT=%O774 /NUMV=01 /DRIVER=DVDRIVER
CONNECT DUA2 /ADAP=0 /CSR=%X0C00 /VECT=%O774 /NUMV=01 /DRIVER=DVDRIVER
CONNECT VCA0 /ADAP=0 /CSR=%X5000 /VECT=%O104 /NUMV=01 /DRIVER=VEDRIVER
CONNECT VCA0 /ADAP=0 /CSR=%X5000 /VECT=%O104 /NUMV=02 /DRIVER=VFDRIVER
```

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1. The first part of the paper discusses the importance of maintaining accurate records of all transactions. This is essential for the proper management of the company's finances and for ensuring that all parties involved are kept informed of the current status of the business.

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